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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 2020

Date: August 6, 2020

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, exchange processes, and the available design options, as well as an ability to develop new methods in order to meet future challenges in an increasingly digitalized world. The primary goal of supply chain management (SCM) is to constantly enhance competitive advantages and to optimize the entire chain organization from strategy to implementation.

Supply chain management has grown from an important instrument of operative optimization into a distinguishing strategic feature in competition. Supply chain management is key to the performance of highly successful enterprises. It adds value for both the company and its clients. Companies' supply chains must be constantly developed, reconfigured, and optimized in order for firms to adapt to changing supply chain environments. This requires the consideration and interpretation of a large number of technological, product, process, geographical, and structural data and conditions; firms must also derive situation-specific responses and anticipate future developments. This requirement calls for well-trained leaders with the ability to accurately position supply chain management as a strategic business function.

These leaders must take on these challenges with a strong desire and ability to master them. Executives and project leaders require suitable methods with which to both handle the increasing complexity of the business environment and reduce it. Therefore, they need a concrete understanding of the interdependencies between supply chain elements and the growing amount of data exchanged between them. This is a prerequisite for a proper understanding of supply chains via data analytics and the application of methods and tools for optimizing 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 increase. Jacobs University's Supply Chain Management (SCM) program 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 abovementioned core challenges in different ways and appropriately roots them in various curriculum modules.

The unique selling point of this program is its 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 the required skills, which are in high demand across industries.

With participating students from different disciplines and various prestigious universities from around the world, the program aligns students´ knowledge base regarding SCM in the first semester and builds on this with specialist modules in the next semester. In the third semester, independent research and

application become more prominent, leading to the preparation of a masters thesis on a challenging topic.

The program is application-oriented. The modules are aligned with real-world issues, involve practitioners from successful companies in various industries, collaborate with companies to conduct case studies, and include field trips. The program's content focuses on companies´ current needs 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 participant involvement. 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, the program emphasizes the participants' personal development in terms of soft skills and language skills. Given the diversity in the student body and their tendency to work in Germany, we train the students in German language proficiency and convey country-specific information to prepare them for the national and international job markets.

The study program chair believes in the value 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 provided to each student by an assigned Academic Advisor as well as regular meetings with the program chair ensure the successful completion of the program despite students' differing 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, in either a national or an international context.

1.3 Qualification Aims

1.3.1 Educational Aims

Firms need skilled employees in order to become trend- and agenda-setters in the latest production and logistics technologies; control and optimization approaches; and customer- and employee-oriented management.

The SCM program aims to provide an in-depth understanding of the essential aspects of 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 in order to prepare them 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 readiness to recognize the potential for change, the initiation of change processes, and their successful design.

Students are introduced to working with and within companies and experience rapid professional development through frequent individual feedback sessions and personal guidance. This facilitates and quickens their career development and helps them to become valuable assets in the workforce within a short period of time.

Jacobs University programs are offered in a highly intercultural environment. Students acquire intercultural competence as part of their education here through everyday group work, class participation, and extracurricular activities. In this way, students gain practical intercultural competencies and build their confidence in an English-speaking work and study environment. Presenting a strong, confident appearance and communicating effectively in various cultural contexts are among the core abilities of internationally successful executives in any business area.

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-world 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 the possible impacts on business, the environment, and society;
- independently investigate complex problems and develop new knowledge using both qualitative and quantitative methods;
- apply interdisciplinary approaches (especially 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 potential conflicts and solve interpersonal issues in large projects;
- communicate clearly and professionally with experts from different disciplines in a variety of forms and moderate interdisciplinary interactions;
- manage multicultural and diverse environments and effectively participate in and lead mixed teams;
- use individual feedback continually to develop and mature within their studies and beyond;
- quickly become acquainted with their work and thus begin 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 to supply chain management issues;
- take responsibility for their own learning, personal development, and social roles;
- 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 to 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 discipline of logistics, economics, engineering, or information technology. Applicants with first degrees in other subject areas who have a proven special affinity or strong interest in the topic and a 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; most graduates enter the job market after completing the program. Non-Germans interested in starting a career in Germany or at a German enterprise will gain the insights and preparation necessary to enter the German labor market.

The program's 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 course of study 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: Graduates will become 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 profiles of the MSc Supply Chain Management graduates are of great interest to companies operating in national and international contexts; medium and large sectors; and trade, service, and 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 open to SCM graduates 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.

Program graduates have found employment at renowned international companies with ease. Those continuing to PhD studies have been accepted to top-ranked universities. According to our alumni surveys, most program graduates start their careers in Germany, usually in the manufacturing industry. Others work in The Netherlands, Denmark, the United States, Switzerland, India, the United Kingdom, Singapore, Belgium, Thailand, China, and elsewhere. Graduates work in diverse industries, such as the automotive, aerospace, consulting, manufacturing, transportation, railway, food and beverage, retail, purchasing, wholesale, and information technology sectors, as well as NGOs.

Jacobs University's Career Services Center and Alumni Association help students in their career development. The Career Services Center provides students with high-quality training and coaching in application and interview preparation, effective presenting, business etiquette, and employer research as well as many other career aspects. It helps students select and achieve rewarding careers after their graduation from Jacobs University. In addition, the Alumni Association helps students establish a long-lasting worldwide network they can use to explore career opportunities in industry and academia.

1.6   Admission Requirements

The Supply Chain Management graduate program 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 in a motivation letter. The general "Admission and Enrollment Policies" of Jacobs University apply (see 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 have 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.

2.1   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, during which students from different educational and cultural backgrounds get acquainted with general methods and knowledge about supply chains and logistics as well as data analytics, programming, language, and soft skills, which are essential for the further development of their studies. The second semester focuses strongly on the different facets of supply chains, such as design, purchasing, and distribution. The third semester introduces 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 the capability to self-organize the preparation of solutions for the 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 (see figure 1). In the third semester, students choose three mandatory elective modules (out of four modules in the core area).

- 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 (see https://campusnet.jacobs-university.de).

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 2020. 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 into students' experiences, demands, and overall impressions of the program. On the module component level, students are asked to perform module component evaluations to ensure that the modules are high-quality and that lecturers can make any necessary changes.
The study program chair makes intensive use of this feedback as well as feedback from industry partners to improve the learning environment, the program's offering, and its progress. The current program was shaped through input from previous experiences and discussions with several stakeholders, including students and industry practitioners.
In exceptional cases, certain necessary deviations from the regulations of this study handbook might occur during the course of study (e.g., change of the semester sequence, assessment type, or the teaching mode of courses). Jacobs University Bremen reserves therefore the right to modify the regulations of the program handbook.

Semester

MSc Degree in Supply Chain Management (120 CP)

4	**Master Thesis** (30 CP)			

3	**Mandatory Electives*** (15 CP): 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

Module Component		Status[1]	Assessment type	Examination period[2]	Semester	CP
Supply Chain Management (SCM)						
Matriculation Fall 2020						
First Semester						**30**
	Core Area					**15**
MCO001-ProjQualRis	*Advanced Project, Quality and Risk Management*					*5*
MCO001-052101	Risk Management	m	Written examination	During the Semester	1	2.5
MCO001-051412	Project Management Concepts	m	Oral examination	Examination period	1	2.5
MCO002-051002	Supply Chain Management and Logistics	m	Written examination	Examination period	1	5
MCO003-051003	Big Data Challenge	m	Term paper	During the Semester	1	5
	Math & Methods Area					**5**
XXXXXX-XXXXXX	Programming in Python	m	Written examination	Examination period	1	5
	Research & Discovery Area					**5**
MRD001-051011	Applied Modeling & Simulation	m	Project report	During the Semester	1	5
	Career Area					**5**
MCA002	Language Skills	m	Written examination	Examination period	1	2.5
MCA001-CommPres	*Communicating and Presenting[3] (to be continued in semester 2)*					*5*
MCA001-051464	Communication and Presentation Skills for Executives	m	Oral presentation	During the Semester	1	2.5

Second Semester						30
1	**Core Area**					15
MCO004-051004	Trends & Challenges in SCM	m	Project report	During the Semester	2	5
MCO005-051005	Advanced Supply Chain Management	m	Project report	During the Semester	2	5
MCO006-PurchDist	*Purchasing & Distribution*					*5*
MCO006-051432	International Purchasing	m	Term paper	During the Semester	2	2.5
MCO006-XXXXXX	Distribution Logistics	m			2	2.5
5	**Math & Methods Area**					5
MMM002-ResMeth	*Research Methods*					*5*
MMM002-XXXXXX	Quantitative Research: Econometrics in SCM	m	Term paper + Written examination	During the Semester	2	2.5
MMM002-XXXXXX	Qualitative Research: Methods and Methodology	m			2	2.5
Module Component		Status[1]	Examination type	Examination period	Semester	Credits
5	**Research & Discovery Area**					5
MRD002-051012	Supply Chain Engineering	m	Group project + Written examination	During the Semester and in the Examination period	2	5
5	**Career Area**					5
MCA002	Language Skills	m	Written examination	During the Semester	2	2.5
MCA001-CommPres	*Communicating and Presenting[3] (continuation from semester 1)*					*5*
MCA001-051016	Academic Writing	m	Writing assignment	During the Semester	2	2.5

Third Semester						**30**
	Core Area (choose 3 modules)					**15**
MCO007-051007	Supply Chain Finance	me	Written examination	Examination period	3	5
MCO008-051008	Data Analytics in Supply Chain Management	me	Project report	During the Semester	3	5
MCO009-051009	Smart Cities and Transportation Concepts	me	Project report	During the Semester	3	5
MCO010-051010	Principles of Consulting	me	Group project	During the Semester	3	5
	Math & Methods Area					**5**
MMM003-XXXXXX	Programming in R	m	Written examination	During the Semester	3	5
	Research & Discovery Area					**5**
MRD003-051013	Research Project	m	Term paper	During the Semester	3	5
	Career Area					**5**
MCA003-Business	Sustainable Business in Germany	m	Written examination	Examination period	3	5
Fourth Semester						**30**
MMT002-051019	Master Thesis	m	Thesis	15th of Mayl	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 the period during which 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 (see http://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

Module Name		Module Code	Level (type)	CP
Advanced Project, Quality and Risk Management		MCO001	Year 1 (CORE)	5.0

Module Components				
Number	Name		Type	CP
MCO001-052101	Risk Management		Lecture	2.5
MCO001-051412	Project Management Concepts		Seminar	2.5

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Fall)	• Lectures (17.5 hours) • Seminar (17.5 hours) • Private Study (90 hours)
☒ None	☒ None	• Verbal and written communication skills	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation
Project Management Institute (2017): A Guide to the Project Management Body of Knowledge (PMBOK® Guide). 6th edition.

Content and Educational Aims
Managing supply chains requires the handling of numerous projects driven by scope, time, resources, cost, quality, and risk factors. This module addresses all project management issues holistically, dealing with quality and risk management in detail. All of these areas involve the transfer of specialist knowledge as well as soft skills. Project management involves 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, especially those that develop rapidly via innovative processes. In research and practice, project management is of increasing importance and it used 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. Quality management is a generic engineering/management tool that 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 focuses on specific methods and techniques as well as application examples in industry. Topics include Quality Function Deployment (QFD), Statistical Process Control, 8 D Process, and lean management methods. 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 threats—such as natural disasters, terrorist attacks, or the loss of important suppliers and service providers—which can disable an organization for days or weeks. Thus, effective risk management can make the difference between survival and collapse for an organization. This part of the module presents the foundations for the general field of risk management before continuing on 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.

Intended Learning Outcomes

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

Project Management

- apply important tools and methods of project management, quality management, and 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;

Quality Management

- 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 (e.g., Pareto analysis, histograms, scatter diagrams, stratification);
- develop an overall philosophy for continuous improvement and total quality management

Risk Management

- apply methods to assess and categorize risks based on their severity, likelihood of occurrence and likelihood of detection;
- design an appropriate supply chain risk management approach based on proactive and reactive strategies;
- make scientifically substantiated decision related to risk categories.

Indicative Literature

N.A.

Usability and Relationship to other Modules

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.

Communication skills and training taught in MCA001 – CommPres facilitate the completion of tasks in this module.

Examination Type: Module Component Examinations

The educational aims and intended learning outcomes of this module require two assessments to evaluate both specialist knowledge in Quality & Risk Management and soft skills (communication and interpersonal skills) in Project Management.

Module Component 1: Lecture

Assessment Type: Written Exam   Duration: 60 minutes
                                                 Weight: 50%

Scope: All intended learning outcomes of the component Risk Management.

Module Component 2: Seminar

Assessment Type: Oral Examination   Duration: 60 minutes
                                                 Weight: 50%

Scope: All intended learning outcomes of the component Project Management Concepts.

Completion: To pass this module, the examination of each module component has to be passed with at least 45%.

6.1.2 Supply Chain Management and Logistics

Module Name		Module Code	Level (type)	CP
Supply Chain Management and Logistics		MCO002	Year 1 (CORE)	5.0

Module Components				
Number	Name		Type	CP
MCO002-051002	Supply Chain Management and Logistics		Lecture	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Dr. Stanislav Chankov	• MSc Supply Chain Management	Mandatory for SCM students Optional for students of other programs

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Fall)	• Lectures (35 hours) • Private Study (90 hours)
☒ None	☒ None	• Logical and analytical skills	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation

Christopher, M (2016): Logistics & Supply Chain Management. 5th edition. Financial Times Publishing.

Content and Educational Aims

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.

The module is structured in three main parts:

- 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

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

- discuss the definitions and terms commonly used in the logistics and supply chain management realm;
- evaluate how logistics and supply chain operations impact the economic success of a company;
- analyze the 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 economic and industry trends impact the logistics and supply chain performance of production and service provider companies;
- 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.

Indicative Literature

N.A.

Usability and Relationship to other Modules

This module is the pre-requisite for several other modules, i.e. MCO004 Trends & Challenges in SCM, MCO005 Advanced Supply Chain Management, MCO006 Purchasing & Distribution, MRD002 Supply Chain Engineering. Project management concepts taught in MCO001 ProjQualRisk will be applied.

Examination Type: Module Examination	
Assessment Type: Written Exam	Duration: 120 minutes Weight: 100%
Scope: All intended learning outcomes of the module.	

6.1.3 Big Data Challenge

Module Name		Module Code	Level (type)	CP
Big Data Challenge		MCO003	Year 1 (CORE)	5.0

Module Components				
Number	Name		Type	CP
MCO003-051003	Big Data Challenge		Lecture	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Adalbert F.X. Wilhelm	• MSc Data Engineering • MSc Supply Chain Management • MSc Psychologie	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	*Co-requisites*	*Knowledge, Abilities, or Skills*	Annually (Fall)	• Lectures (17.5 hours) • Project Work (90 hours) • Private Study (17.5 hours)
☒ None	☒ None	• Researching information, assessing sources and report writing	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation
N.A.

Content and Educational Aims
Big data is a current buzzword that refers to the collection and exploration of complex datasets. This complexity of big data is typically described in terms of 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 is naturally most 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 of big data by looking at it from various aspects, primarily the business and societal points of view. The focus is not on technical methods and skills but on case studies that show big data and data engineering in a cross-section.

Intended Learning Outcomes
By the end of this module, students will be able to: • communicate clearly to SCM stakeholders about topics such as big data, digitalization, and industry 4.0; • explain and discuss the pros and cons of digitalization from a business and societal perspective; • independently investigate problems related to big data issues by performing a SWOT analysis on current big data initiatives; • evaluate technological possibilities and innovations driven by big data; • assess the business opportunities of current big data developments.

Indicative Literature			
N.A.			

Usability and Relationship to other Modules			
Concepts are applied in MCO004 Trends & Challenges in Supply Chain Management. Project management concepts taught in MCO001 ProjQualRisk will be applied. Academic writing skills taught in MCA001 – CommPres facilitate the completion of the tasks in this module.			

Examination Type: Module Examination	
Assessment Type: Term Paper	Length: 2.500 words Weight: 100%
Scope: All intended learning outcomes of the module.	

6.1.4 Trends & Challenges in Supply Chain Management

Module Name		Module Code	Level (type)	CP
Trends & Challenges in Supply Chain Management		MCO004	Year 1 (CORE)	5.0

Module Components				
Number	Name		Type	CP
MCO004-051004	Trends & Challenges in Supply Chain Management		Seminar	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Spring)	• Seminar (35 hours) • Group Work (45 hours) • Private Study (45hours)
• MCO003-051003 Big Data Challenge • MCO002-051002 Supply Chain Management and Logistics	☒ None	• Researching information, assessing sources, verbal communication skills	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation
DHL (2018): Logistics Trend Radar: Delivering insight today, creating value tomorrow. Version 2018/2019.

Content and Educational Aims
Manufacturing and logistics systems are subject to permanent technological advances. Progress in manufacturing and logistics technologies for processing, handling, transport, and warehousing are reshaping processes and structures. This module deals with current and near-future technologies used in manufacturing and logistics systems. These are cross-cutting technologies that touch upon different skills, departments, and disciplines and show a high degree of complexity that need to be managed. This module also looks at select technologies under development and in early stages of application in laboratories and in industrial innovation centers by analyzing their potential and limitations and their effects on current supply chains and manufacturing systems.

Intended Learning Outcomes

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

- assess the effects of complex technologies on manufacturing and logistics systems;
- integrate knowledge on trends in supply chains and logistics issues;
- independently and holistically investigate new trends in SCM;
- develop alternative approaches to SCM issues;
- derive the costs and benefits of these technologies;
- analyze the potential of new cross-cutting technologies and communicate them clearly to stakeholders;
- manage the change requirements posed by new technologies;
- apply project management tools to effectively work in teams to perform group project tasks.

Indicative Literature

N.A.

Usability and Relationship to other Modules

Aspects taught in both MCO003-051003 Big Data Challenge and MCO002-051002 Supply Chain Management and Logistics as well as project management concepts taught in MCO001 ProjQualRisk will be applied. Academic writing skills in MCA001 – CommPres facilitate the completion of the tasks in this module.

Examination Type: Module Examination

Assessment Type: Project Report   Length: 2.500 words
                                                   Weight: 100%

Scope: All intended learning outcomes of the module.

6.1.5   Advanced Supply Chain Management

Module Name		Module Code	Level (type)	CP
Advanced Supply Chain Management		MCO005	Year 1 (CORE)	5.0

Module Components				
Number	Name		Type	CP
MCO005-051005	Advanced Supply Chain Management		Seminar	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Spring)	• Seminar (35 hours) • Group Work (45 hours) • Private Study (45hours)
• MCO002-051002 Supply Chain Management and Logistics	☒ None	• Researching information, assessing sources, verbal communication skills	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation

Markin, S & Sinha, A. (2018): SAP Integrated Business Planning - Functionality and Implementation. Rheinwerk Publishing / SAP Press.

Content and Educational Aims

Ensuring seamless material flows along globalized and digitalized supply chains is becoming increasingly 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.

In this module, students will deal with challenges imposed by such global and digitalized supply chains by using specific software. By 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. They will understand both the possibilities and limits of such software through hands-on exercises and case studies that they will solve by using it.

Intended Learning Outcomes

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

- 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 applications
- measure progress using specified control tools;
- set up and deploy such software in a company´s IT landscape.

Indicative Literature

N.A.

Usability and Relationship to other Modules
This module complements MCO002-051002 Supply Chain Management and Logistics by using a complex planning system in supply chains.
Examination Type: Module Examination
Assessment Type: Project Report   Length: 2.500 words   Weight: 100% Scope: All intended learning outcomes of the module.

6.1.6 Purchasing and Distribution

Module Name		Module Code	Level (type)	CP
Purchasing and Distribution		MCO005	Year 1 (CORE)	5.0

Module Components				
Number	Name		Type	CP
MCO006-050232	International Purchasing		Seminar	2.5
MCO006-050231	Distribution Logistics		Seminar	2.5

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Spring)	• Seminar (35 hours) • Group Work (45 hours) • Private Study (45 hours)
• MCO002-051002 Supply Chain Management and Logistics	☒ None	• Logical thinking	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation

Van Weele, A. (2018): Purchasing and Supply Chain Management. 7th edition. Cengage Learning EMEA Publishing.

Content and Educational Aims

This module covers two main aspects of supply chain management: purchasing and distribution.

The first part of the module deals with purchasing as a part of the entire business as well as with the 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 throughout the students' careers. The aim here is to gain a deep understanding of the possibilities and challenges procurement offers and faces in an organization. Another aim is to improve economic thinking skills and gain an understanding of how the key elements influence a business and its financial standing.

A major objective of the second part of the module is to equip students with a sound knowledge 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 today will be outlined. Based on that knowledge, 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 addressed. Finally, last-mile-delivery concepts, with a focus on different business models (e.g., online retailers, the sharing economy), will be covered alongside the associated challenges for traditional transport and distribution strategies and novel solution approaches.

Intended Learning Outcomes

After successful completion of the module, students should be able to:

Purchasing

- 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 the different people involved in purchasing;
- think economically and understand how the key elements in purchasing influence a business and its financial standing;

Distribution
- design distribution systems by considering and combining different modes of transportation and warehousing;   - critically evaluate and apply methods of efficiently running distribution processes;   - evaluate the challenges and opportunities warehouses and distribution centers are facing to fulfill specific requirements;   - deal with the rising importance and complexity of last-mile deliveries and novel methods of tackling associated delivery problems;   - independently investigate solutions for complex delivery systems and develop alternative approaches.

Indicative Literature
N.A.

Usability and Relationship to other Modules
This module deals in detail with purchasing and distribution concepts introduced in MCO002-051002 Supply Chain Management and Logistics and MCO005-051005 Advanced Supply Chain Management and concepts taught in MCO001 – ProjQualRisk will be applied. Academic writing skills in MCA001 – CommPres facilitate the completion of the tasks in this module.

Examination Type: Module Examination	
Assessment Type: Term Paper	Length: 2.500 words Weight: 100%
Scope: All intended learning outcomes of the module.	

6.1.7   Supply Chain Finance

Module Name		Module Code	Level (type)	CP
Supply Chain Finance		MCO007	Year 1 (CORE)	5.0

Module Components				
Number	*Name*		*Type*	*CP*
MCO007-051007	Supply Chain Finance		Lecture and Seminar	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory elective for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	*Co-requisites*	*Knowledge, Abilities, or Skills*	Annually (Fall)	• Lecture (17.5 hours) • Seminar (17.5 hours) • Private Study (90 hours)
• MCO002-051002 Supply Chain Management and Logistics • MCO005-051005 Advanced Supply Chain Management	☒ None	☒ None	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation

Templar et al. (2016): Financing the End-to-end Supply Chain: A Reference Guide to Supply Chain Finance. Kogan Page Publishing.

Content and Educational Aims

Supply chains involve not only 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 firm shareholders and stakeholders.

This module uses case studies from manufacturers, distributors, and retailers to gain an understanding of financial needs and means. The module gives students a comprehensive and thorough overview and understanding of the different strategies and applications of supply chain finance.

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.

Intended Learning Outcomes

After successful completion of the module, students should be able to:

- 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 for financing supply chain activities in global markets and make informed decisions;
- independently investigate financing issues in SCM activities using quantitative methods;

• develop strategies to optimally satisfy stakeholders' and shareholders' expectations and to clearly communicate to them.

Indicative Literature
N.A.

Usability and Relationship to other Modules
This module complements MCO002-051002 Supply Chain Management and Logistics and MCO005-051005 Advanced Supply Chain Management by looking at financial aspects.

Examination Type: Module Examination	
Assessment Type: Written Exam	Duration: 120 minutes Weight: 100%
Scope: All intended learning outcomes of the module.	

6.1.8 Data Analytics in Supply Chain Management

Module Name		Module Code	Level (type)	CP
Data Analytics in Supply Chain Management		MCO008	Year 2 (CORE)	5.0

Module Components				
Number	Name		Type	CP
MCO008-051008	Data Analytics in Supply Chain Management		Lecture	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr.-Ing. Hendro Wicaksono	• MSc Supply Chain Management • MSc Data Engineering	Mandatory elective for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites • MMM012-350111 – Programming in Python	Co-requisites ☒ MMM003-051020 - Programming in R	Knowledge, Abilities, or Skills • Basics of statistical analytics and machine learning • Basics of database and SQL • Basics of programming skills, such as R, Python, and Java	Annually (Fall)	• Lecture and feedback sessions (35 hours) • Group Work (45 hours) • Private Study (45 hours)
			Duration 1 semester	**Workload** 125 hours

Recommendations for Preparation

Sanders, N. Big data driven supply chain management: a framework for implementing analytics and turning information into intelligence, Pearson Education, 2014.

Content and Educational Aims

In recent years, big data has become a significant topic in supply chain management, as the amount of data generated in supply chain management practices has grown exponentially. Data analytics are techniques that apply data mining, statistical analysis, predictive analytics, and machine learning to uncover hidden patterns, correlations, trends, and other business-valuable information and knowledge from data.

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:

- Descriptive statistics on and historical insight into companies' production, financial, operations, sales, customers, etc.
- Forecasting customer behavior, purchasing patterns, production performance, energy consumption, etc.
- Prescriptive analytics for assessing 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:

- 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 that objective;
- apply methods and tools to collect and 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 for improving supply chain management processes;
• evaluate data analytics results in different scenarios and solve the problems that might occur throughout the entire data analytics process, from data collection to analysis;
• develop deployment architecture concepts by integrating existing tools/software;
• develop business model and ecosystem concepts.

Indicative Literature
N.A.

Usability and Relationship to other Modules
Programming methods, such as R and Python, taught in MMM001 Programming in Python and MMM003-051020 Programming in R 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.

Examination Type: Module Examination
Assessment Type: Project Report Length: 2.500 words Weight: 100%
Scope: All intended learning outcomes of the module.

6.1.9 Smart Cities and Transportation Concepts

Module Name		Module Code	Level (type)	CP
Smart Cities and Transportation Concepts		MCO009	Year 2 (CORE)	5.0

Module Components				
Number	Name		Type	CP
MCO009-051009	Smart Cities and Transportation Concepts		Lecture	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr.-Ing. Hendro Wicaksono	• MSc Supply Chain Management	Mandatory elective for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Fall)	• Lecture and feedback sessions (35 hours) • Group Work (45 hours) • Private Study (45 hours)
• MCO003-051003 Big Data Challenge	☒ None	☒ None	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation

McClellan,S; Jimenez, J.A.; Koutitas, G.: Smart Cities Applications, Technologies, Standards, and Driving Factors, Springer, 2018.

Content and Educational Aims

In recent years, cities around the world have been initiating and developing ideas and projects that use the word "smart." These projects and ideas are characterized by technologies, such as green energy, artificial intelligence, internet-of-things, and self-driving vehicles, that require large amounts of data. This module focuses on the main considerations of smart-city projects, including intelligent transportation (public transportation, urban logistics, smart vehicle) and environmental infrastructure (energy, water, and waste), and the technological backbone, such as the internet-of-things, cloud computing, and data analytics.

Intended Learning Outcomes

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

- identify typical scenarios of smart-city projects and evaluate the opportunities and challenges involved;
- discover the 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 datasets and analyze the data needed to improve decision-making in smart-city contexts.

Indicative Literature

N.A.

Usability and Relationship to other Modules

Concepts of MCO003-051003 Big Data Challenge as well as project management concepts taught in MCO001 ProjQualRisk will be applied. Academic writing skills taught in MCA001 – CommPres facilitate the completion of the tasks in this module.

6.1.10 Principles of Consulting

Module Name		Module Code	Level (type)	CP
Principles of Consulting		MCO010	Year 2 (CORE)	5.0

Module Components				
Number	Name		Type	CP
MCO010-051010	Principles of Consulting		Lecture and Seminar	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory elective for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites			Annually (Fall)	• Lectures (17.5 hours)
	Co-requisites	Knowledge, Abilities, or Skills		• Seminars (17.5 hours)
• MCA001 Communicating & Presenting	☒ None	☒ None		• Group Work (45 hours) • Private Study (45 hours)
			Duration	**Workload**
			1 semester	125 hours

Recommendations for Preparation

Newton, R. (2012): The Management Consultant: Mastering the Art of Consultancy. 1st edition. FT / Prentice Hall Publishing.

Content and Educational Aims

Managing supply chains involves many activities and projects that require expert skills, which may not be available in the company. Thus, support from experienced consultants outside the company is crucial. Graduates of SCM may not end up in supply chain-related departments in companies but may also work with consultancies focusing on supply chain issues. This module gives a deep understanding of 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 setups, and client interfaces, as well as assessments of project results.

Intended Learning Outcomes

After successful completion of this module, students will be able to:

- apply the interdisciplinary concepts and methods of supply chain consulting;
- independently investigate complex problems and develop creative solutions;
- use advanced analytical tools and decide which tools and methods are optimal for each situation;
- communicate professionally with firm experts and use their feedback to improve solutions;
- detect potential conflicts in consultancy projects;
- gain a deep understanding of supply chain processes and apply quantitative decision-making tools to improve them;

• make systematic and data-driven decisions regarding the issues at hand and assess their impact on business processes; • develop a professional self-perception as consultants based on consultancy standards.	

Indicative Literature

N.A.

Usability and Relationship to other Modules

Concepts of MCO003-051003 Big Data Challenge as well as project management concepts taught in MCO001 ProjQualRisk will be applied. Academic writing skills taught in MCA001 – CommPres facilitate the completion of the tasks in this module.

Examination Type: Module Examination

Assessment Type: Group Project   Length: 2.500 words
                                                                 Weight: 100%

Scope: All intended learning outcomes of the module.

6.2 Research & Discovery Area

6.2.1 Applied Modeling & Simulation

Module Name		Module Code	Level (type)	CP
Applied Modeling & Simulation		MRD001	Year 1 (Research and Discovery)	5.0

Module Components				
Number	Name		Type	CP
MRD001-051011	Applied Modeling & Simulation		Lecture and Lab	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	*Co-requisites*	*Knowledge, Abilities, or Skills*	Annually (Fall)	• Lectures (17.5 hours) • Lab (17.5 hours) • Group Work (45 hours) • Private Study (45 hours)
☒ None	• MCO002-051002 Supply Chain Management and Logistics	• Basic software knowledge, analytical skills, verbal communication skills	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation

Law M., Kelton W. (2000): Simulation Modeling and Analysis. McGraw-Hill.

Content and Educational Aims

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 allow one to develop analytical methods of predicting the system's behavior, and implementing any changes is risky for the overall performance of the system. Simulations can be used to derive insights into the behavior of complex systems before changes are implemented. In this module, students will learn how to develop and conduct simulation experiments to analyze the behavior of complex supply chain systems.

Throughout the module, different aspects of supply chains—such as production and material flow along the supply chain, distribution networks, and market diffusion—are modeled and simulated by applying discrete-event and agent-based modeling techniques.

Students will prepare assignments based on the created models, and they will work on a final group project dealing with a complex problem.

Intended Learning Outcomes

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

- model highly dynamic supply chain systems;
- apply different simulation methods (especially discrete-event and agent-based methods) to design and analyze processes;
- independently investigate bottlenecks and inefficiencies in such complex systems;

- analyze the results of simulation runs and clearly communicate them to stakeholders;
- independently find and evaluate alternative solutions 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 selected solutions by using and communicating the optimal simulation result;
- apply project management tools to effectively work in teams to solve complex problems.

Indicative Literature

N.A.

Usability and Relationship to other Modules

Aspects of MCO002-051002 Supply Chain Management and Logistics are foundational for modeling purposes and project management concepts taught in MCO001 ProjQualRisk will be applied. Academic writing and communication skills taught in MCA001 – CommPres facilitate the completion of the tasks in this module.

Examination Type: Module Examination

Assessment Type: Project Report

Length: 2.500 words
Weight: 100%

Scope: All intended learning outcomes of the module.

6.2.2 Supply Chain Engineering

Module Name		Module Code	Level (type)	CP
Supply Chain Engineering		MRD002	Year 1 (Research and Discovery)	5.0

Module Components				
Number	Name		Type	CP
MRD002-051012	Supply Chain Engineering		Lecture and Seminar	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Dr. Stanislav Chankov	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Spring)	• Lectures (17.5 hours) • Seminars (17.5 hours) • Group Work (45 hours) • Private Study (45 hours)
• MCO002-051002 Supply Chain Management and Logistics	☒ None	• Basic knowledge in spreadsheet software	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation

Ravindra, A. R. & Warsing Jr., D. (2012): Supply Chain Engineering – Models and Applications. CRC Press.

Content and Educational Aims

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.

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.

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 alignment and a well-articulated supply chain strategy, supported by tactical skills and knowledge.

Intended Learning Outcomes

After successful completion of this module, students will be able to:

Mathematical Modeling in SCM

- 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;

Integrated Decision-making in SCM

- 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.

Indicative Literature

N.A.

Usability and Relationship to other Modules

Extends MCO002-051002 Supply Chain Management and Logistics 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.

Examination Type: Module Examination

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.

Assessment Component 1: Group Project   Weight: 50%

Scope: Intended learning outcomes of Integrated Decision-making.

Assessment Component 2: Written Examination   Duration: 120 minutes
                                                               Weight: 50%

Scope: Intended learning outcomes of Mathematical Modeling in SCM.

Completion: This module is passed with an assessment-component weighted average grade of 45% or higher.

6.2.3 Research Project

Module Name		Module Code	Level (type)	CP
Research Project		MRD002	Year 2 (Research and Discovery)	5.0

Module Components				
Number	Name		Type	CP
MRD002-051012	Research Project		Seminar	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	*Co-requisites*	*Knowledge, Abilities, or Skills*	Annually (Fall)	• Seminars (35 hours) • Private Study (90 hours)
• MCA001 – Communication & Presenting	☒ None	• Good verbal and written communication skills	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation
Saunders, M. et al. (2015): Research Methods for Business Students. 7th edition. Pearson.

Content and Educational Aims

Supply Chain Management graduates need to develop research skills, not only to prepare for their master's thesis but also because many graduates pursue an academic career. Thus, profound research skills as of utmost importance.

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. Focusing on a specific example of such a complex industry, this module deals with value chain management issues, analyzing theoretical and practical questions from the viewpoint of economics and business administration.

Typical research questions concern the general market structure of the industry. What are the competition and regulation issues in the industry? How critical is vertical and/or horizontal coordination, and how are information flows and coordination handled along the supply chain? What are the possible vertical integration or fragmentation problems in the sector? Are there problems involving risks and cost structures, ownership, investments, or innovation?

This seminar requires the students to work in small groups to prepare a research paper on value chain management and analyze specific economic issues in the selected industry based on applied scientific literature and methods. The main aim is to learn to think independently and critically.

Intended Learning Outcomes

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

- write and review a research paper with an applied scientific background;
- select and evaluate the relevant literature;
- assess the key arguments in the debate critically and independently;
- develop an ability to conduct reasonable, reflective, and stringent argumentation;
- communicate precisely in a concise and clear manner at an academic level;
- communicate in discussions and presentations in class with precision.

Indicative Literature

N.A.

Usability and Relationship to other Modules

Extends the academic writing skills taught in MCA001 – CommPres with a focus on the preparation of MMT002 Master Thesis.

Examination Type: Module Examination

Assessment Type: Term Paper   Length: 2.500 words
                                                         Weight: 100%

Scope: All intended learning outcomes of the module.

6.3 Math & Methods Area

6.3.1 Programming in Python

Module Name		Module Code	Level (type)	CP
Programming in Python		MMM012	Year 1 (Math and Methods)	5.0

Module Components				
Number	Name		Type	CP
MMM012-350111	Programming in Python		Lecture	5.0

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Fall)	• Lectures (35 hours) • Private Study (90 hours)
☒ None	☒ None	• Logical thinking, analytical skills	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation
Severance, C.R.; Blumenberg, S.; Hauser, E. (2016): Python for Everybody: Exploring Data in Python 3. Create Space Independent Publishing Platform.

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 used by data analysts and data scientists. It has a broad spectrum of applicability, since Python was designed as a general-purpose programming language. As an open-source project, Python builds on a huge worldwide user and developer community, which has extended its capabilities. In this module, students will receive a solid introduction to 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: • apply and perform data handling and data manipulation tasks in Python;   • apply their knowledge to implement code in Python;   • be familiar with the typical applications of Python in data science.

Indicative Literature
N.A.

Usability and Relationship to other Modules
Pre-requisite for MMM013-990203 Programming in R.

6.3.2   Research Methods

Module Name		Module Code	Level (type)	CP
Research Methods		MMM002	Year 1 (Math and Methods)	5.0

Module Components				
Number	Name		Type	CP
MMM002-990222	Quantitative Research: Econometrics in SCM		Lecture	2.5
MMM002-990202	Qualitative Research: Methods and Methodology		Lecture	2.5

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Spring)	• Lectures (35 hours) • Private Study (90 hours)
⊠ None	⊠ None	• Analytical skills	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation
MacKinnon, J.G. (2008): Econometric Theory and Methods. International Edition. Oxford University Press.

Content and Educational Aims
This module consists of both qualitative and quantitative research methods. The latter provide students with essential background in the 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 today's widespread access to user-friendly and often open-source statistical software, the course will provide a stronger emphasis on the underlying logic and limitations of the methods rather than on their formal mathematical-statistical technicalities. It will thereby help students acquire the background knowledge, skills, and intuitive understanding necessary to implement and correctly interpret quantitative research, particularly in the field of supply chain management. Qualitative research, the second component of this module, is concerned with meaning, such as the meaning 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 the purposive sampling strategies suitable for an in-depth discovery of meaning, discusses how researchers acquire their data (e.g., through interviews, focus groups, observation), and reviews methods for the analysis of qualitative data (e.g., various types of coding, content analysis, discourse analysis, visual analysis). 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 delivered partly as a seminar and partly as a lab where students apply the course methods to data drawn from their own fields of study. During the lab sessions, students are required to participate in and report on activities involving the application and trial of selected methods. Students will

also 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.

Intended Learning Outcomes

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

- 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.

Indicative Literature

N.A.

Usability and Relationship to other Modules

Academic writing skills taught in MCA001 – CommPres facilitate the completion of the tasks in this module. Methods taught may be used in MMT002 Master Thesis depending on the thesis topic.

Examination Type: Module Component Examinations

Module Component 1: Quantitative Research: Econometrics in SCM

Assessment Type: Written Examination   Duration: 120 minutes
                                                    Weight: 50%

Scope: Intended learning outcomes 1-2.

Module Component 2: Qualitative Research: Methods and Methodology

Assessment Type: Term Paper   Length: 2.500 words
                                               Weight: 50%

Scope: Intended learning outcomes 3-4.

Completion: To pass this module, the examination of each module component has to be passed with at least 45%.

6.3.3   Programming in R

Module Name		Module Code	Level (type)	CP
Programming in R		MMM013	Year 2 (Math and Methods)	5.0
Module Components				
Number	Name		Type	CP
MMM013-9902203	Programming in R		Lecture	5.0
Module Coordinator Prof. Dr. Yilmaz Uygun	**Program Affiliation** • MSc Supply Chain Management		**Mandatory Status** Mandatory for SCM students	

Entry Requirements			Frequency	Forms of Learning and Teaching
			Annually (Fall)	
Pre-requisites	*Co-requisites*	*Knowledge, Abilities, or Skills*		• Lectures (17.5 hours) • Project Work (35 hours)

• MMM012- 350112 Programming in Python	☒ None	• Logical thinking, analytical skills		• Private Study (72.5 hours)
			Duration	**Workload**
			1 semester	125 hours

Recommendations for Preparation

Dalgaard, P. (2008): Introductory Statistics with R. 2nd edition. Springer.

Content and Educational Aims

R is a trendy statistical software and programming environment for data analytics. In this course, students will learn to work with R, to explore its various features, and learn all essential steps and commands for reading data and for converting, cleaning, storing, and transforming them in order to prepare them for statistical analyses. Moreover, students will be guided through exploratory data analysis cases. They will also be given an overview of the different machine learning techniques available in R packages and how to access them.

Intended Learning Outcomes

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

- 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.

Indicative Literature

N.A.

Usability and Relationship to other Modules

Co-requisite of MCO008 – DataAnaSCM. Project management concepts taught in MCO001 ProjQualRisk will be applied.

Examination Type: Module Examination

Assessment Type: Written Exam   Duration: 120 minutes
                                                                 Weight: 100%

Scope: All intended learning outcomes of this module.

6.4 Career Area

6.4.1 Communicating and Presenting

Module Name		Module Code	Level (type)	CP
Communicating and Presenting		MMM013	Year 1 (CAREER)	5.0

Module Components				
Number	*Name*		*Type*	*CP*
MCA001-051464	Communication & Presentation Skills for Executives		Lecture	2.5
MCA001-051016	Academic Writing		Lecture	2.5

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	*Co-requisites*	*Knowledge, Abilities, or Skills*	Annually (Fall)	• Lectures (35 hours) • Private Study (90 hours)
☒ None	☒ None	• Verbal and written communication skills	**Duration** 2 semesters	**Workload** 125 hours

Recommendations for Preparation
Zemach, D.E. & Rumisek, L.A. (2005): Academic Writing – From Paragraph to Essay. Edumond.

Content and Educational Aims

Successful managers in the fields of logistics and supply chains need good skills in both written and verbal communication. This module accounts for that need.

Communication & Presentation Skills for Executives

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 to people of different cultural backgrounds. This covers employees and/or direct reports, business partners, and customers. The ability to present and communicate succinctly and confidently while being culturally aware, building a 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.

Academic Writing

The academically rigorous nature of graduate studies requires students to master academic writing skills and techniques. In this introductory module component, students in the SCM master's program will learn the foundations of academic writing at a graduate level, with a focus on writing academic essays, identifying organizational patterns in academic texts, and formulating arguments to produce cohesive and coherent academic papers. Students will improve their writing skills through drafting, continuous feedback, and editing. This module component will also help students develop their research skills by highlighting techniques for finding and evaluating sources and utilizing citation and referencing styles. Adhering to the Code of Academic Integrity is a requirement for graduate students. Hence, this module component will incorporate a session on the scholarly and intellectual standards set by Jacobs University.

The two components in this module complement each other, with one part placing strong emphasis on communication and presenting information orally, and the second focusing on presenting and communicating academic information in a written form.

Intended Learning Outcomes

After successful completion of this module, students will be able to:

Communication & Presentation Skills for Executives

- apply methods in order 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 (e.g., Ignite, Pecha Kucha, Pitching);
- apply the basics of logical reasoning in oral (deductive/inductive) presentations;
- develop oratory and rhetorical skills drawing on Aristotle's teaching of logos, ethos, and pathos;
- apply the basics of interpersonal communication (e.g., Johari Window, 4-Ears model);
- give and receive constructive feedback;
- present themselves in different business situations;
- collaborate effectively in intercultural teams;

Academic Writing

- 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 in their discipline;
- avoid unintentional plagiarism and adhere to the code of academic integrity.

Indicative Literature

N.A.

Usability and Relationship to other Modules

This module is foundational for several modules in which 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.

Examination Type: Module Component Examinations

The educational aims and intended learning outcomes of this module require both an oral and a written assessment. Two separate module component assessments, both of which have to be passed:

Module Component 1: Communication & Presentation Skills for Executives

Assessment Type: Oral Presentation   Duration: 30 minutes
                                                                                  Weight: 50%

Scope: Intended learning outcomes of the module component *Communication & Presentation Skills for Executives.*

Module Component 2: Academic Writing

Assessment Type: Writing Assignment   Length: 2.500 words
                                                                                  Weight: 50%

Scope: Intended learning outcomes of the module component *Academic Writing.*

Completion: To pass this module, the examination of each module component has to be passed with at least 45%.

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

Module Name		Module Code	Level (type)	CP
Sustainable Business in Germany		MMM013	Year 2 (CAREER)	5.0

Module Components				
Number	*Name*		*Type*	*CP*
MCA003-051017	Business in Germany		Lecture	2.5
MCA003-051522	Ethics & Sustainable Business		Lecture	2.5

Module Coordinator	Program Affiliation	Mandatory Status
Dr. Silke Cramer	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	*Co-requisites*	*Knowledge, Abilities, or Skills*	Annually (Fall)	• Lectures (17.5 hours) • Seminars (17.5 hours) • Group Work (17.5 hours) • Private Study (72.5 hours)
☒ None	☒ None	• Basic knowledge of German	**Duration** 1 semester	**Workload** 125 hours

Recommendations for Preparation

Fraedrich, J. & Ferrell, O.C. (2014): Business Ethics: Ethical Decision Making & Cases. Cengage Learning.

Content and Educational Aims

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, and also by considering ethical and sustainability issues in the German business context.

First, the course focuses on current topics in the German economic ecosystem. This helps students orientate themselves within Germany and understand the German business culture and landscape. Germany is an important logistics hub, and many international companies operate in the German market. Therefore, besides a solid command of the German language, good knowledge about Germany's economy and institutions is also important as it prepares SCM students for both a career within Germany and an international career dealing with German suppliers and customers. Content-wise, the evolution and historical background of the German economy, starting with the German "Wirtschaftswunder" and proceeding to European integration with its implications for the economy and business life will be taught. Additionally, Germany's current complex business landscape along with its 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. When feasible, parts of the component are conducted in German.

The module will also address ethics and sustainability issues, norms, and values in Germany. Ethics, or morality, concerns the 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 relationships, and the proper use of power and authority. Ethical principles, rules, and regulations as well as sustainable business practices in Germany will be dealt with. Specific topics include the economic aspects of sustainability as well as the 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) as they relate to supply chain management in a global setting represent a useful and potentially critical component for preparing future professionals to be effective contributors to a company or society.

Intended Learning Outcomes

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

- analyze and interpret economic developments in Germany and their effects on business operations.
- Analyze and (for startups) 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 and sustainable/unsustainable behavior for the success and growth of a business;
- deal with the legal aspects of ethics and sustainability by applying methods of preventing and dealing with corruption and accountability, especially in Germany;
- apply measures 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.

Indicative Literature

N.A.

Usability and 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.

Examination Type: Module Examination

Assessment Type: Written Exam   Duration: 120 minutes
                                                                 Weight: 100%

Scope: All intended learning outcomes of this module.

6.5   Master Thesis

Module Name			Module Code	Level (type)		CP
Master Thesis			MMT002	Year 2		30.0

Module Components					
Number	Name			Type	CP
MMT002-051019	Master Thesis			Thesis	30.0

Module Coordinator	Program Affiliation	Mandatory Status
Prof. Dr. Yilmaz Uygun	• MSc Supply Chain Management	Mandatory for SCM students

Entry Requirements			Frequency	Forms of Learning and Teaching
Pre-requisites	*Co-requisites*	*Knowledge, Abilities, or Skills*	Annually (Spring)	• Private Study (732.5 hours) • Group Sessions (17.5 hours)
• Successful completion of at least 85 CP	☒ None	• Proficiency in the area of the chosen thesis topic	**Duration** 1 semester	**Workload** 750 hours

Recommendations for Preparation

- 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.

Content and Educational Aims

The Master Thesis course provides an opportunity for students to develop their interest 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.

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, aims, and goals.

The thesis will be accompanied by a research colloquium where students have to present their thesis projects in an appropriate form (e.g., on posters) to 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 in oral presentation skills.

Intended Learning Outcomes

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

- 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 examine new unsolved problems or issues;

- critically asses 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 their research results to and discuss them with various audiences;
- take into consideration the social and ethical consequences of their activities.

Indicative Literature

N.A.

Usability and Relationship to other Modules

Depending on the topic, methods taught in MMM002 Research Methods may be used; Academic writing skills taught in MCA001 Communicating & Presenting (within the module MCA001 – CommPres) as well as project management concepts (especially time management) taught in MCO001 ProjQualRisk will be applied.

Examination Type: Module Examination

Assessment Component: Master's Thesis

Length: 25.000 words
Weight: 100%

Scope: All intended learning outcomes of this 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 – DataAnaSCM	MCO009 – SmartCit	MCO010 – PrincCons	MRD001 – Appl ModSim	MRD002 – SCEng	MRD003 - ResProj	MMM001 – ProgrPyth	MMM002 – ResMeth	MMM003 – ProgR	MCA001 – CommPres	MCA002 – LanguageMa	MCA003 – Business	MMT002 - MasterThesis
Semester					1	1	1	2	2	2	3	3	3	3	1	2	3	1	2	3	1-2	1-2	3	4
Mandatory/ optional					m	m	m	m	m	m	me	me	me	me	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	30
Program Learning Outcomes / Competencies*	A	E	P	S																				
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
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
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
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
efficiently and effectively manage supply chain related projects in multicultural and diverse environments;		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	
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
manage multicultural and diverse environments and effectively participate in and lead mixed teams;		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
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
develop a professional self-perception based on goals and standards of professional actions in SCM;		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
take responsibility for their own learning, personal development and role in society;			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
Assessment Type																								
oral examination					x																			
final written exam					x	x					x					x		x	x		x	x	x	
project report							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