Supply Chain Management (online)

Master of Science

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

The subject-specific examination regulations for Supply Chain Management (online) are defined in this program handbook and are valid only in combination with the General Examination Regulations for master's degree programs ("General Master Policies").

This handbook also contains the program-specific Study and Examination Plan (in chapter 2.2).

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

Valid for all students starting their studies in Fall 2024.

Version	**Valid as of**	**Decision**	**Details**
Fall 2024 – V1	Sep 01, 2024	Jan 31, 2024	Originally approved by Academic Senate

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1 Program Overview

1.1 Background

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

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

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

1.2 Concept

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

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

Admitting students from different disciplines from different prestigious universities worldwide, the program aligns students´ knowledge on SCM in the first semester and builds on this with specialist modules in the next semester. From the third semester, independent research and application becomes more prominent, which eventually results in preparing a master's thesis on a challenging topic.

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

The program's educational approach is characterized by its strong practical relevance and high involvement of participants. Lecturers enthusiastically apply the latest instruction techniques and interactive online 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, business games, flipped classroom or peer teaching, etc. Moreover, critical discussions are encouraged in order to inspire and improve the students' understanding of module contents.

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

The program builds on experience-based learning. Hence, faculty, lecturers and tutors intensively use case studies, business games, simulations, etc., as active teaching methods. Furthermore, students learn and remotely work successfully in interdisciplinary and intercultural teams.

Intensive communication and exchange between lecturers and participants are central elements of the program. The support of students by professors, lecturers and tutors as well as meetings with the program chair fosters the successful completion of the program despite different learning rates and entry knowledge levels.

The successful completion of the program leads to the conferral of a Master of Science (MSc) degree and will enable a quick career entry in the area of Supply Chain Management, be it in a national or an international context.

1.3 Qualification Aims

1.3.1 Educational Aims

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

The online Supply Chain Management program aims to provide an in-depth understanding of the essential aspects in designing, maintaining and analyzing supply chains as well as teach the skills necessary to apply methods and tools to successfully and responsibly work on and in supply chains/networks. The program seeks to expand the participants' competencies and capabilities to be prepared for all upcoming tasks and developments within increasingly digitalized supply chains. The curriculum aims to teach modern leadership and management competencies with a strong emphasis on data analytics and engineering. This includes the analysis of data-driven business processes, the ability and the readiness to recognize the potential for change, the initiation of change processes and the successful design of those change processes.

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

Constructor University is an international university. Students gain practical intercultural competencies through joint activities and build up their confidence in an English-speaking work and study environment. One of the core abilities of internationally successful executives in any business area is a strong, confident appearance and communication ability in various cultural contexts.

1.3.2 Intended Learning Outcomes

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

1. 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;
2. integrate new knowledge in complex supply chain contexts based on extensive data analytics;
3. assess opportunities and risks in global supply networks;
4. make scientifically substantiated and data-driven decisions in the context of SCM and logistics and critically reflect possible impacts on business, environment and society;
5. independently investigate complex problems and develop new knowledge using both qualitative and quantitative methods;
6. apply interdisciplinary approaches (esp. from data science and engineering as well as mathematics) to solve academic and professional problems;
7. efficiently and effectively manage supply chain related projects in multicultural and diverse environments;
8. detect conflict potentials and solve interpersonal issues in large projects;
9. communicate clearly and professionally with experts from different disciplines in a variety of forms and moderate in interdisciplinary interaction;
10. manage multicultural and diverse environments and effectively participate in mixed teams;
11. use feedback on a continuous basis to develop and mature within their studies and beyond;
12. quickly become acquainted with their work and hence start their career more easily because of the integration of theory and practice during their education;
13. develop a professional self-perception based on goals and standards of professional actions in SCM;

14. justify their professional actions with methodical knowledge and develop alternative approaches for issues they face in managing supply chains;
15. take responsibility for their own learning, personal development and role in society;
16. adhere to and defend ethical, scientific and professional standards.

1.4 Online teaching and learning

1.4.1 General Framework

Constructor University online study programs focus on the holistic learning success of students and offer a variety of synchronous and asynchronous formats that align with problem and project-based learning.
The online master program in SCM applies proven and effective teaching and learning modalities that engage distance learners and support a vibrant learning community. This means that students participate in online courses with predominantly asynchronous lectures and learning activities that are complemented by synchronous tutorials and hands-on sessions.

Students are guided and supported by faculty as well as experienced tutors and lecturers to transfer acquired knowledge into practice. The hands-on elements include dedicated collaboration with other students through the use of tools and concepts that enable distributed work from different places and different time-zones.

Students enrolled in online study programs will find their course materials such as videos, case studies, scholarly articles, websites, podcasts, online games etc. on a Learning Management Software (LMS) platform provided by Constructor University.

1.4.2 Student Workload

The module size for every module in this program except for the master thesis is 5 CP. Studying in an online program at Constructor University involves students actively participating in reading, preparing assignments, meeting with peers in group projects, synchronous tutor sessions, and watching the required videos.

The terms used in the module data sheets that refer to student workload are defined as follows:

- Asynchronous Self-study = time that that student uses in predefined study contents on digital platforms. Main goal is to acquire content and methods.

- Interactive Learning = time that students spend in a synchronous manner with tutors and in study groups and working on group projects.

- Independent Study = time that students use with recommended further study content and first application of acquired knowledge.

- Assessment preparation = Application of acquired knowledge to specific problems that serve as examples of typical exam questions or writing term papers, designing presentations etc.

1.4.3 Academic Tutors

Academic tutors specifically support the instructor of records and students within the graduate program in their asynchronous teaching and learning. They hold tutorial sessions for online students (individually or in groups) and serve as a first point of contact for student concerns and questions regarding asynchronous learning material and their learning process. In this way, we guarantee that all students, regardless of the global time zone in which they live, can be fully supported by Constructor University.

1.4.4 Assessment and Grading

In Constructor University's online study programs, we particularly emphasize formative forms of assessment. Formative assessment is used to monitor and evaluate how students are learning as they work through a module or study program. It is designed to help students learn more effectively by giving them feedback on their performance and on how it can be improved and/or maintained. It may be marked pass-fail, complete-incomplete, or other rating scale as part of the requirement to qualify for or participate in the final assessment. There are also similar assessment formats, so-called summative assessment with a final grade at the end of the course as in the on-campus teaching, e.g. written exams, presentations, and lab reports.
Any type of assessment may be conducted electronically or complemented by electronic and online assessment and submission elements. This includes computerized testing in a test center, video interviews, online/electronic submission and other formats which use electronic systems and/or devices. For computerized assessments, students will be offered an introduction to the system used to familiarize themselves with it.

1.4.5 Learning Management Software

Constructor University's online classes are supported by technology that includes a learning management system (LMS) and additional education technology tools that may be integrated into the LMS or offered as an alternative environment for students to engage in or to apply their knowledge and skills and to participate in simulations. The LMS includes discussion forums, assignments and quizzes, a gradebook, calendars, instructor and student dashboards. Additional tools offered may include video or document annotations, virtual labs for a variety of technical skills, gamified experiences, and more. The LMS and some associated tools enable timely communication to the students that can support time management and motivation to engage in their course work. The students will have access to applications that enable group work and peer-to-peer communication.

1.5 Target Audience

The program is designed for students of different professional, geographical and cultural backgrounds. Candidates with working experience and candidates currently employed in the free economy who are interested in gaining more theoretical knowledge are particularly addressed by the program.

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

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

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

1.6 Career Options

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

The program prepares its participants to become decision makers in an increasingly interconnected world: true managers of the digitalized economy. Graduating from the SCM (online) program opens the door to a wide range of careers in Germany, Europe and around the globe. The data analytics and engineering oriented profile of the online MSc Supply Chain Management graduates are of great interest to companies operating in national and international, medium and large-sized, trade and service as well as production industries. Graduates are particularly qualified for tasks in the fields of supply chain management, logistics, procurement, retail, process optimization and beyond.

The career paths that open up for graduates of SCM (online) 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.

Graduates of this program will find employment at renowned international companies with ease. Those continuing to PhD studies will have great chances to be accepted to top-ranking universities. Graduates may work in diverse industries such as automotive, aerospace, consulting, manufacturing, transportation, railway, food & beverage, retail, purchasing, wholesale, information technology as well as in NGOs.

The Career Service Center (CSC) helps students in their career development. It provides students with high-quality training and coaching in CV creation, cover letter formulation, interview preparation, effective presenting, business etiquette, and employer research as well as in many other aspects, thus helping students identify and follow up on rewarding careers after graduating from Constructor University. Furthermore, the Alumni Office helps students establish a long-lasting and global network which is useful when exploring job options in academia, industry, and elsewhere.

1.7 Admission Requirements

The graduate program Supply Chain Management (online) requires students to hold at least a good Bachelor's degree in the areas of business administration, logistics, economics, industrial engineering and management, or in information technology. Applicants need to prove a strong interest in the contents of the study program, to be explained in a motivation letter.

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 Constructor University takes place in a highly intercultural student body. It is therefore necessary to be willing to join such a multicultural-international community.

Admission to Constructor University is selective and based on a candidate's university achievements, recommendations and self-presentation. Students admitted to Constructor University demonstrate exceptional academic achievements, intellectual creativity, and the desire and motivation to make a difference in the world.

The following documents need to be submitted with the application:

- Letter of motivation
- Curriculum vitae (CV)
- Official or certified copies of university transcripts
- Bachelor's degree certificate or equivalent
- Language proficiency test results (minimum score of 90 (TOEFL), 6.5 (IELTS) or 110 (Duolingo)).
- Copy of Passport
- Letter of recommendation (optional).

Formal admission requirements are subject to higher education law and are outlined in the Admission and Enrollment Policy of Constructor University.

For more detailed information about the admission visit:
https://constructor.university/admission-aid/application-information-graduate

1.8 More Information and Contact

For more information on the study program please contact the Study Program Chair:

Prof. Dr. Dr. Yilmaz Uygun

Professor of Logistics Engineering, Technologies and Processes

Email: yuygun@constructor.university

or visit our program website: https://constructor.university/programs/graduate-education/supply-chain-management

For more information on Student Services please visit:

https://constructor.university/student-life/student-services

2 The Curriculum

2.1 The Curriculum at a Glance

The Supply Chain Management (online) 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 thesis.

The first semester is a foundational semester in which students from different educational and cultural backgrounds get acquainted with general methods and knowledge about supply chain and logistics as well as data analytics, programming, language and soft skills that is essential for the further development of their studies. In the second semester, there is a strong focus on the different facets of supply chains, such as design, purchasing, distribution, etc. In the third semester, emphasis is put on introducing students to complex tasks in science and industry. Students are expected to demonstrate their capabilities to self-organize the preparation of solutions for current theoretical and practical scientific problems. During the fourth and final semester students work on their master thesis.

The modules are grouped into five areas (see figure 1). These are:

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

The default module size is 5 CP.

2.2 Schematic Study Plan for Supply Chain Management (online)

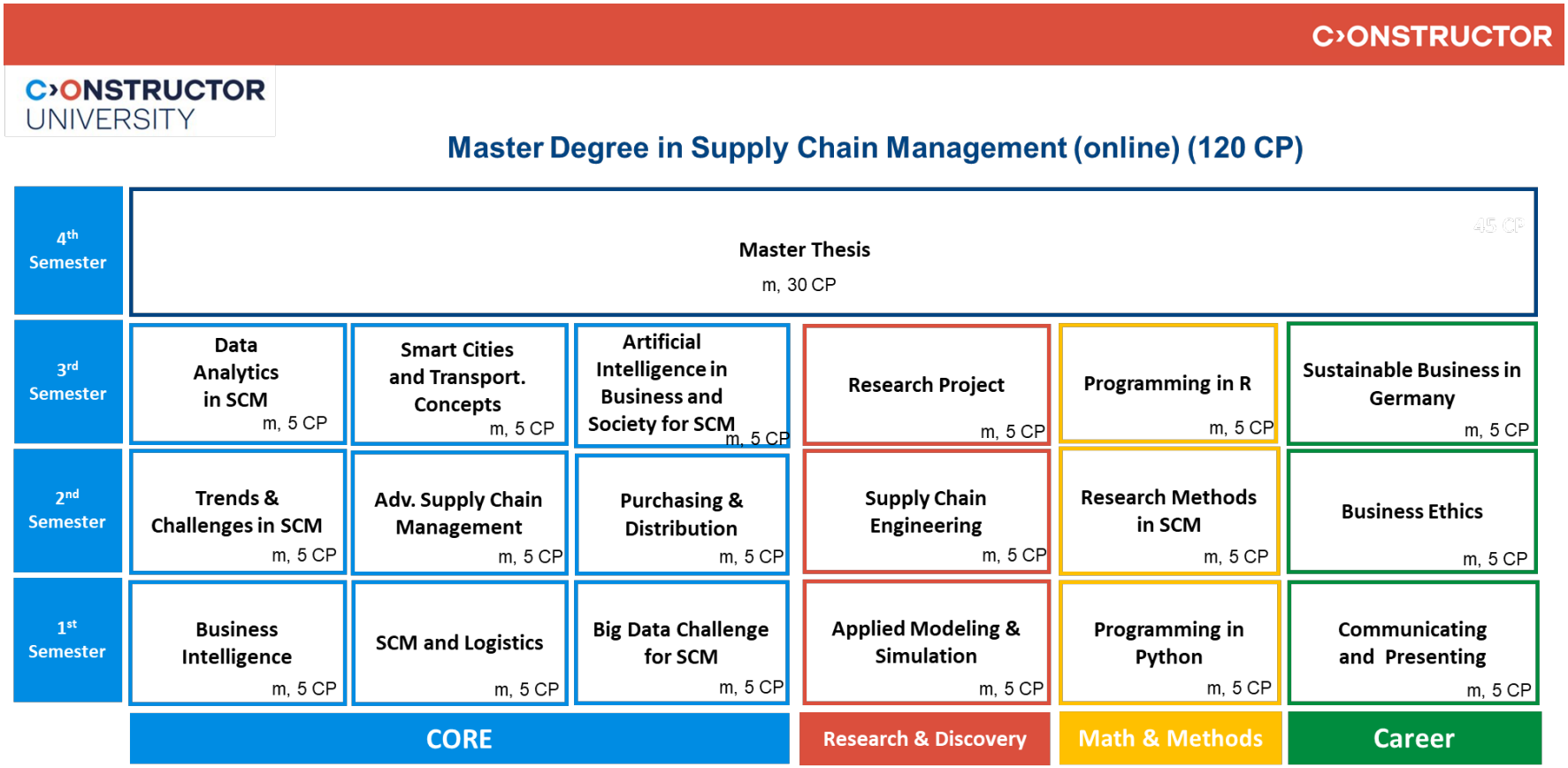

Figure 1: Schematic Study Plan for Supply Chain Management (online)

2.3 Study and Examination Plan

MSc Degree in Supply Chain Management (online) Matriculation Fall 2024							
Module Code	**Program-Specific Modules**	**Type**	**Assessment**	**Period[1]**	**Status[2]**	**Semester**	**CP**
Semester 1							**30**
	Core						**15**
	Module: Business Intelligence				**m**	**1**	**5**
	Business Intelligence	Lecture (online)	Project report	During semester			
	Module: Supply Chain Management and Logistics				**m**	**1**	**5**
	Supply Chain Management and Logistics	Lecture (online)	Written examination	Examination period			
	Module: Big Data Challenge for SCM				**m**	**1**	**5**
	Big Data Challenge	Lecture (online)	Project report	During semester			2.5
	Big Data Challenge -Tutorial	Tutorial (online)					2.5
	Math and Methods						**5**
	Module: Programming in Python				**m**	**1**	**5**
	Programming in Python	Lecture (online)	Term Paper	During semester			
	Research and Discovery						**5**
	Module: Applied Modeling & Simulation				**m**	**1**	**5**
	Applied Modeling & Simulation	Lecture (online)	Project report	During semester			
	Career						**5**
	Module: Communicating and Presenting				**m**	**1**	**5**
	Communicating and Presenting	Lecture (online)	Oral presentation	During semester			
Semester 2							**30**
	Core						**15**
	Module: Trends & Challenges in SCM				**m**	**2**	**5**
	Trends & Challenges in SCM	Lecture (online)	Project report	During semester			
	Module: Advanced Supply Chain Management				**m**	**2**	**5**
	Advanced Supply Chain Management	Lecture (online)	Project report	During semester			
	Module: Purchasing & Distribution				**m**	**2**	**5**
	Purchasing & Distribution	Lecture (online)	Term paper	During semester			
	Math and Methods						**5**
	Module: Research Methods in SCM				**m**	**2**	**5**
	Research Methods in SCM	Lecture (online)	Term paper	During semester			
	Research and Discovery						**5**
	Module: Supply Chain Engineering				**m**	**2**	**5**
	Supply Chain Engineering	Lecture (online)	Project assessment & Written examination	During semester & Examination period			
	Career						**5**
	Module: Business Ethics				**m**	**2**	**5**
	Business Ethics	Lecture (online)	Term paper	During semester			

Semester 3							**30**
	Core						**15**
	Module: Artificial Intelligence in Business and Society for SCM				**m**	**3**	**5**
	Artificial Intelligence in Business and Society	Lecture (online)	Project report	During semester			
	Artificial Intelligence in Business and Society- Tutorial	Tutorial (online)					
	Module: Data Analytics in Supply Chain Management				**m**	**3**	**5**
	Data Analytics in Supply Chain Management	Lecture (online)	Project report	During semester			
	Module: Smart Cities and Transportation Concepts				**m**	**3**	**5**
	Smart Cities and Transportation Concepts	Lecture (online)	Project report	During semester			
	Math and Methods						**5**
	Module: Programming in R				**m**	**3**	**5**
	Programming in R	Lecture (online)	Term paper	During semester			
	Research and Discovery						**5**
	Module: Research Project				**m**	**3**	**5**
	Research Project	Lecture (online)	Term paper	During semester			
	Career						**5**
	Module: Business in Germany				**m**	**3**	**5**
	Business in Germany	Lecture (online)	Term paper	During semester			
Semester 4							**30**
	Module: Master Thesis SCM (online)				**m**	**4**	**30**
	Master Thesis MSc SCM (online)	Thesis	Thesis				
	Master Thesis Defenese		Oral examination				
Total CP							**120**

[1] 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

[2] m = mandatory

Figure 2: Study and Examination Plan for online Supply Chain Management

2.4 Core Area (45 CP)

The Core Area consists of modules that focus on key topics in managing supply chains in a digitalized world. Students will learn both state-of-the art and emerging concepts of key functions in companies as it relates to supply chains.

To pursue a SCM (online) master, the following Core modules (45 CP) need to be taken as mandatory modules (m):

- Business Intelligence (m, 5 CP)
- Supply Chain Management and Logistics (m, 5 CP)
- Big Data Challenge for SCM* (m, 5 CP)
- Trends & Challenges in Supply Chain Management (m, 5 CP)
- Advanced Supply Chain Management (m, 5 CP)
- Purchasing & Distribution (m, 5 CP)
- Data Analytics in Supply Chain Management* (m, 5 CP)
- Smart Cities and Transportation Concepts* (m, 5 CP)
- Artificial Intelligence in Business and Society for SCM* (m, 5 CP)

The modules marked with an asterisk are shared across different graduate programs at Constructor University, i.e. Data Engineering Technologies (online) and Data Science for Business and Society (online).

2.5 Research and Discovery Area (15 CP)

The Research and Discovery Area consists of modules that comprise digital techniques that are necessary to understand, model, design and analyze supply chains.

To pursue a SCM (online) master, the following Research and Discovery modules (15 CP) need to be taken as mandatory modules (m):

- Applied Modeling & Simulation (m, 5 CP)
- Supply Chain Engineering (m, 5 CP)
- Research Project (m, 5 CP)

2.6 Math and Methods Area (15 CP)

The Math and Methods Area consists of modules focusing on programming languages and research methods that are fundamental for data analytics and beyond as it relates to supply chain management.

To pursue a SCM (online) master, the following Math and modules (15 CP) need to be taken as mandatory modules (m):

- Programming in Python (m, 5 CP)
- Research Methods in SCM (m, 5 CP)
- Programming in R (m, 5 CP)

2.7 Career Area (15 CP)

The Career Area consists of modules addressing soft skills that are necessary for supply chain managers when it comes to articulating their ideas, taking responsibility for their decisions and contributing to the economic ecosystem.

To pursue a SCM (online) master, the following Career modules (15 CP) need to be taken as mandatory modules (m):

- Communicating & Presenting (m, 5 CP)
- Business Ethics (m, 5 CP)
- Sustainable Business in Germany (m, 5 CP)

2.8 Master Thesis (30 CP)

In the fourth semester, students conduct research and write a mandatory master thesis guided and supported by their thesis supervisors, worth 30 credit points.

- Thesis Module: Master Thesis (m, 30 CP)

The Master thesis provides an opportunity for students to develop their interests in a specific subject area or specialization, and to demonstrate their ability to undertake independent research. Before being eligible to submit the final thesis, students must present and submit a research proposal in advance.

3 Supply Chain Management Graduate Program Regulations

3.1. Scope of These Regulations

The regulations in this handbook are valid for all students who entered the SCM (online) graduate program at Constructor University in Fall 2024. In case of conflict between the regulations in this handbook and the general policies for master online studies, the latter shall apply (see https://constructor.university/student-life/student-services/university-policies/academic-policies)Academic policies | Constructor University

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).

In general, Constructor University reserves therefore the right to change or modify the regulations of the program handbook according to relevant policies and processes also after its publication at any time and in its sole discretion.

3.2 Degree

Upon successful completion of the 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 CP. Students need to complete all mandatory components of the program, as indicated in Chapter 2 of this handbook.

3.4 Other Program-Specific Policies & Practices

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

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

4 Modules

4.1 Core Area (45 CP)

4.1.1 Business Intelligence

Module Name Business Intelligence			**Module Code** MSCMO-101	**Level (type)** Year 1 (CORE)	**CP** 5
Module Components					
Number	Name			Type	CP
MSCMO-101-A	Business Intelligence			Lecture (online)	5
Module Coordinator NN	**Program Affiliation** • MSc Supply Chain Management (SCM) (online)			**Mandatory Status** Mandatory for SCM (online)	
Entry Requirements Pre-requisites ☒ None	Co-requisites ☒ None	Knowledge, Abilities, or Skills • Basics of statistical analytics and Basics of database and SQL	**Frequency** Annually (Fall)	**Duration** 1 semester	

Student Workload				
Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
35 h	17.5 h	45 h	27.5 h	125 h

Recommendations for Preparation

Sharda, R.; Delen, D.; Turban,E.; King, D. (2017): Business Intelligence: A Managerial Approach, Global Edition. Person Education.

Content and Educational Aims

Business Intelligence (BI) refers to the process of collecting, analyzing, and presenting data to support business decision-making. BI involves the use of software tools and techniques to gather data from various company-wide sources and databases and transform it into meaningful insights and reports to provide decision-makers with accurate and up-to-date information that can be used to make strategic decisions. BI can help businesses identify trends, opportunities, and areas for improvement, and can be used in a variety of areas, such as sales and marketing, finance, operations, and human resources.

To account for the project nature of such BI related tasks, students will work on projects with datasets and need to prepare a project report to successfully pass this module.

Some common BI techniques and tools include, but is not limited to:

- Data Mining

- Data Warehousing.
- Reporting
- Dashboarding

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. discuss different definitions and terms commonly used in BI;
2. evaluate how BI can help make better decisions;
3. apply software tools and techniques to perform data analyses and reporting;
4. compare and contrast different BI techniques and their contribution to successful decision making;
5. integrate BI in logistics and SCM processes to understand and analyze real-world problems.

Indicative Literature

Sharda, R.; Delen, D.; Turban,E.; King, D. (2017): Business Intelligence: A Managerial Approach, Global Edition. Person Education.

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Project report Length: 2,500 words
Weight: 100%

Scope: All intended learning outcomes of the module

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

4.1.2 Supply Chain Management and Logistics

Module Name	**Module Code**	**Level (type)**	**CP**
Supply Chain Management and Logistics	MSCMO-102	Year 1 (CORE)	5

Module Components

Number	Name	Type	CP
MSCMO-102-A	Supply Chain Management and Logistics	Lecture (online)	5

Module Coordinator	**Program Affiliation**	**Mandatory Status**
NN	• MSc Supply Chain Management (SCM) (online)	Mandatory for SCM (online)

Entry Requirements			**Frequency**	**Duration**
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Fall)	1 semester
☒ None	☒ None	• Logical and analytical skills		

Student Workload

Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
20 h	40 h	20 h	45 h	125 h

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 method.
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

Upon completion of this module, students will be able to

1. discuss different definitions and terms commonly used in the logistics and supply chain management realm;
2. evaluate in what way logistics and supply chain operations impact the economic success of a company;
3. analyze processes and strategies of procurement, production and distribution logistics;
4. develop solutions to logistics problems by applying different methods and tools for analyzing and improving logistics/ supply chain processes
5. evaluate how the economic and industry trends impact the logistics and supply chain performance of production and service provider companies;
6. compare and contrast different supply chain strategies and their applicability to different settings;
7. integrate knowledge in logistics and SCM to solve different case studies and real-world problems.

Indicative Literature

Usability and Relationship to other Modules

This module is the pre-requisite for several other modules, i.e. Trends & Challenges in SCM, Advanced Supply Chain Management, Purchasing & Distribution, Supply Chain Engineering

Examination Type: Module Examination

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

Scope: All intended learning outcomes of the module

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

4.1.3 Big Data Challenge for SCM

Module Name	**Module Code**	**Level (type)**	**CP**
Big Data Challenge for SCM	MSCMO-103	Year 1 (Core)	5

Module Components

Number	Name	Type	CP
MDET-101-A	Big Data Challenge Lecture	Lecture (online)	2.5
MDET-101-B	Big Data Challenge Tutorial	Tutorial (online)	2.5

Module Coordinator	**Program Affiliation**	**Mandatory Status**
Prof. Dr. Adalbert F.X. Wilhelm	• MSc Data Engineering Technologies (DET) (online)	Mandatory for SCM (online)

Entry Requirements			**Frequency**	**Duration**
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Fall)	1 semester
☒ None	☒ None	• Researching information, assessing sources and report writing		

Student Workload

Asynchronous Self Study	Interactive Learning	Exam Preparation	Independent Study	Hours Total
35 h	17.5 h	60 h	12.5 h	125 h

Recommendations for Preparation

- Read the Syllabus.
- Read Susan Ettlinger (2015). What Do we do with all this Big Data? Altimeter. https://www.prophet.com/2015/01/new-research-what-do-we-do-with-all-this-big-data/
- Watch corresponding TEDTalk.

Content and Educational Aims

Big data is one of the buzz words of the current decade and refers to the collection and exploration of complex data sets. This complexity of big data is typically described by the four V's: Volume, Velocity, Variety, and Veracity. From a business perspective, big data is often portrayed as a sea of big opportunities. The public debate is torn between the two poles portrayed by the writers George Orwell and Aldous Huxley: complete surveillance resulting in oppression on the one end, and irrelevance and narcissism on the other. Technological research quite naturally is mostly concerned with the technical feasibility of different approaches, the continuously increasing challenges with respect to the four V's, and the creative solutions needed to tackle them.

This module will equip students with the fundamental knowledge needed to harness the power of Big Data by providing an overview on key concepts of Big Data Analytics, including data collection, storage, processing, and governance.

In the lecture component we will explore the foundations, methodologies, and techniques used to extract valuable insights from massive datasets. The course begins with an overview of Big Data and its implications in various industries. Students will gain a solid understanding of the challenges posed by Big Data, such as data quality, scalability, and privacy, and explore solutions to overcome these obstacles. Next, we will delve into the fundamentals of data processing and storage technologies, including Hadoop, and Spark. Students will learn how to design distributed systems that can handle vast amounts of data efficiently. Data governance is a crucial aspect of any Big Data course. It plays a vital role in ensuring the

quality, integrity, and security of data throughout its lifecycle. In this course, students will gain a comprehensive understanding of data governance principles and best practices.

The tutorial offers students the possibility to foster their knowledge by asking questions, discussing specific issues, and by collaborating and debating with their peers. Particularly, the tutorial will guide and support the students through their project work.

Intended Learning Outcomes

Upon completion of this module, students will be able to:

1. contribute knowledgeably to the current debate about big data, digitalization and industry 4.0;
2. explain and discuss pros and cons of digitalization from a business perspective as well as a societal perspective;
3. understand the fundamental concepts and challenges of Big Data Analytics.
4. evaluate technological possibilities and innovations driven by big data;
5. assess the business opportunities of current big data developments.

Indicative Literature

McLellan (2013): Big Data: An Overview, https://www.zdnet.com/article/big-data-an-overview/
V. Mayer-Schönberger & K.Cukier: "Big Data: A Revolution That Will Transform How We Live, Work, and Think", 2013.
S. Akter & S. Fosso Wamba, Big data analytics in e-commerce: A systematic review and agenda for future research, 2016. Electronic Markets, 26 173-194.
Z. Lv, H. Song, P. Basanta-Val, A. Steed and M. Jo. "Next-Generation Big Data Analytics: State of the Art, Challenges, and Future Research Topics," in IEEE Transactions on Industrial Informatics, vol. 13, no. 4, pp. 1891-1899, Aug. 2017.
B.Balamurugan, A. R. Nandharini: “Big Data: Concepts, Technology, and Architecture

Usability and Relationship to other Modules

For SCM: This module provides an overview on big data challenges, fundamental concepts, and applications. It adds the data architecture aspect to the supply chain perspective and hence complements the core SCM modules.

Examination Type: Module Examination

Assessment Type: Project Report — Length: 4000 words, Weight: 100%

Scope: All intended learning outcomes of the module

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

4.1.4 Trends & Challenges in Supply Chain Management

Module Name Trends & Challenges in Supply Chain Management			**Module Code** MSCMO-104	**Level (type)** Year 1 (Core)	**CP** 5
Module Components					
Number	Name			Type	CP
MSCMO-104-A	Trends & Challenges in Supply Chain Management			Lecture (online)	5
Module Coordinator NN	**Program Affiliation** • MSc Supply Chain Management (SCM) (online)			**Mandatory Status** Mandatory for SCM (online)	
Entry Requirements Pre-requisites ☒ Supply Chain Management and Logistics	Co-requisites ☒ None	Knowledge, Abilities, or Skills • Researching information, assessing sources, verbal communication skills	**Frequency** Annually (Spring)	**Duration** 1 semester	

Student Workload				
Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
35 h	35 h	35 h	20 h	125 h

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 advancements. Progress in manufacturing and logistics technologies for processing, handling, transport and warehousing reshape processes and structures.
This module deals with current and near-future technologies to be used in manufacturing and logistics systems. These are cross-cutting technologies that touch upon different skills, departments, and disciplines that show a high degree of complexity to be managed. This module also looks at select technologies under development and in early stage of application in laboratories and in industrial innovation centers by analyzing their potentials and limitations and effects on current supply chain and manufacturing systems.
Students will work in groups to discuss and ponder on future technologies in supply chain management and need to prepare related group projects to successfully pass this module.

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. assess the effects of complex technologies in manufacturing and logistics systems;
2. integrate the knowledge on trends in supply chain and logistics issues;
3. independently and holistically investigate new trends in SCM;
4. develop alternative approaches to SCM issues;
5. derive costs and benefits of these technologies;
6. analyze the potentials of new cross-cutting technologies and communicate them clearly to stakeholders;
7. manage the change requirements posed by new technologies;
8. apply project management tools to effectively work in teams in order to perform the group project task.

Indicative Literature

MacCarthy, B.L., Ivanov, D. (2022): The Digital Supply Chain. 1st Edition. Elsevier.

Usability and Relationship to other Modules

Aspects taught in both Big Data Challenge and Supply Chain Management and Logistics as well as Business Intelligence will be applied. Presentation skills 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

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

4.1.5 Advanced Supply Chain Management

Module Name Advanced Supply Chain Management			**Module Code** MSCMO-105	**Level (type)** Year 1 (Core)	**CP** 5
Module Components					
Number	Name			Type	CP
MSCMO-105-A	Advanced Supply Chain Management			Lecture (online)	5
Module Coordinator NN	**Program Affiliation** • MSc Supply Chain Management (SCM) (online)			**Mandatory Status** Mandatory for SCM (online)	
Entry Requirements Pre-requisites ☒ Supply Chain Management and Logistics	Co-requisites ☒ None	Knowledge, Abilities, or Skills • Researching information, assessing sources, written communication skills	**Frequency** Annually (Spring)	**Duration** 1 semester	
Student Workload					
Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total	
35 h	35 h	35 h	20 h	125 h	

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 more and more challenging. Supply chain managers require information and planning systems that are capable of properly planning, scheduling and controlling material flows across different locations. Thus, such planning systems (e.g. SAP Integrated Business Planning) are an important asset in today´s supply chains.

In this module, students will deal with challenges imposed by such global and digitalized supply chains by using such kind of software. In using this software, students will learn how best to plan, monitor and control processes in operations, demand and inventory planning by considering planning models and user roles. Thus, they will understand the possibilities and also limits of such software by means of hands-on exercises and case studies to be solved with such software.

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. work with supply chain-related advanced planning systems to efficiently manage supply chains;
2. configure and use different applications, such as operations, demand, supply, and inventory planning
3. measure progress with specified control tools;
4. set up and deploy such software in a company´s IT landscape.

Indicative Literature

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

Usability and Relationship to other Modules

Aspects taught in Supply Chain Management and Logistics as well as Business Intelligence will be applied.

Examination Type: Module Examination

Assessment Type: Project report Length: 2,500 words
Weight: 100%

Scope: All intended learning outcomes of the module

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

4.1.6 Purchasing & Distribution

Module Name Purchasing & Distribution			**Module Code** MSCMO-106	**Level (type)** Year 1 (Core)	**CP** 5
Module Components					
Number	Name			Type	CP
MSCMO-106-A	Purchasing & Distribution			Lecture (online)	5
Module Coordinator NN	**Program Affiliation** • MSc Supply Chain Management (SCM) (online)			**Mandatory Status** Mandatory for SCM (online)	
Entry Requirements			**Frequency**	**Duration**	
Pre-requisites ☒ Supply Chain Management and Logistics	Co-requisites ☒ None	Knowledge, Abilities, or Skills • Logical thinking	Annually (Spring)	1 semester	

Student Workload				
Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
35 h	10 h	45 h	35 h	125 h

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 & Distribution.

Purchasing is a vital function in SCM for the entire business as well as a major prerequisite for profitable business. This part is based on group work and discussions with a focus on collaborative approaches and on understanding and developing these approaches in future doings of students. The aim here is to gain a deep understanding of possibilities and challenges procurement offers and faces in an organization. Another aim is to improve economical thinking skills and understanding how the key elements influence a business and its financial standing.

A major objective of distribution is to equip students with a sound knowledge and understanding of processes and key business challenges within the field of distribution. Here, the evolution of distribution logistics from direct to store deliveries in the early 1970s up to same day deliveries and omnichannel supply chains developed by companies presently will be outlined. Based on that, new operational challenges imposed by e-commerce on the warehousing aspect of distribution logistics, namely the emergence of e-fulfillment centers and the increasing importance of parcel and sorting delivery centers will be addressed. Eventually, concepts in last mile delivery with a focus on different business models (e.g. online retailers, sharing economy, etc.) will be covered alongside the associated challenges for traditional transport and distribution strategies and novel solution approaches.

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. critically assess and apply different purchasing models for an efficient supply of goods;
2. develop purchasing strategies, plans and related processes in a global environment;
3. develop team working skills and ability to cooperate with different people involved in purchasing;
4. think economically and understand how the key elements in purchasing influence a business and its financial standing;
5. design distribution systems by considering and combining different modes of transportation and warehouses;
6. critically evaluate and apply methods related to efficiently running distribution processes;
7. evaluate challenges and opportunities warehouses and distribution centers face to fulfill specific requirements;
8. deal with the rising importance and complexity of last-mile deliveries and novel methods to tackle associated delivery problems;
9. independently investigate solutions for complex delivery systems and develop alternative approaches.

Indicative Literature

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

Usability and Relationship to other Modules

This module deals in detail with purchasing & distribution concepts introduced in Supply Chain Management and Logistics and Advanced Supply Chain Management.

Examination Type: Module Examination

Assessment Type: Term paper Length: 2,500 words
Weight: 100%

Scope: All intended learning outcomes of the module

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

4.1.7 Data Analytics in Supply Chain Management

Module Name Data Analytics in Supply Chain Management			**Module Code** MSCMO-203	**Level (type)** Year 2 (Core)	**CP** 5
Module Components					
Number	Name			Type	CP
MSCMO-203-A	Data Analytics in Supply Chain Management			Lecture (online)	5
Module Coordinator NN	**Program Affiliation** • MSc Supply Chain Management (SCM) (online)			**Mandatory Status** Mandatory for SCM (online)	
Entry Requirements Pre-requisites ☒ Programming in Python	Co-requisites ☒ None	Knowledge, Abilities, or Skills • Basics of statistical analytics and machine learning • Basics of data base and SQL • Basics of programming skills such as R, Python, or Java	**Frequency** Annually (Fall)	**Duration** 1 semester	

Student Workload				
Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
35 h	17.5 h	45 h	27.5 h	125 h

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 generated data in supply chain management practices has grown exponentially. Data analytics refer to techniques that apply data mining, statistical analysis, predictive analytics, machine learning, etc. to uncover hidden patterns, correlations, trends, and other business valuable information and knowledge from data.

The module focuses on the supply chain management scenarios that generate and consume data intensively and require data analytics to improve the decision making process through descriptive, predictive, and prescriptive analytics. These include, for example:

- Descriptive statistics and historical insight of companies' production, financial, operations, sales, customers, etc.
- Forecasting customer behavior, purchasing patterns, production performance, energy consumption, etc.

Prescriptive analytics to assess the offer that should be made to a certain customer, to decide on the shipment strategy for each location, to determine the most efficient material flow in a factory, etc.

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. identify scenarios in supply chain management and evaluate the opportunities and challenges of data analytics applications;
2. determine the objective of data analytics in different scenarios and the data sources required to achieve the objectives;
3. apply methods and tools to collect and to integrate data from different sources in the context of supply chain management;
4. apply machine learning and statistical analytics methods and tools to uncover hidden patterns, correlations, trends, and knowledge that are useful to improve supply chain management processes;
5. evaluate data analytics results in different scenarios and solve the problems that might occur during the whole data analytics processes from data collection to analytics;
6. develop deployment architecture concepts by integrating existing tools/software;
7. develop business model and ecosystem concepts.

Indicative Literature

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

Usability and Relationship to other Modules

Programming methods, such as R and Python, taught in Programming in Python and Programming in R will be applied

Examination Type: Module Examination

Assessment Type: Project report Length: 2,500 words
Weight: (100%)

Scope: All intended learning outcomes of the module

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

4.1.8 Smart Cities and Transportation Concepts

Module Name	**Module Code**	**Level (type)**	**CP**
Smart Cities and Transportation Concepts	MSCMO-202	Year 2 (Core)	5

Module Components

Number	Name	Type	CP
MSCMO-202-A	Smart Cities and Transportation Concepts	Lecture (online)	5

Module Coordinator	**Program Affiliation**	**Mandatory Status**
NN	• MSc Supply Chain Management (SCM) (online)	Mandatory for SCM (online)

Entry Requirements			**Frequency**	**Duration**
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Fall)	1 semester
☒ Big Data Challenge for SCM	☒ None			

Student Workload

Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
35 h	17.5 h	45 h	27.5 h	125 h

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”. The projects and ideas are characterized by technologies, such as green energy, artificial intelligence, internet-of-things or self-driving vehicles, which require large amounts of data. This module focuses on the main considerations of smart city projects which include intelligent transportation (public transportation, urban logistics, smart vehicle) and environmental infrastructure (energy, water, and waste), as well as the technological backbone such as internet of things, cloud computing and data analytics.

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. identify typical scenarios of smart city projects and evaluate the opportunities and challenges;
2. discover backbone technologies required for intelligent transportation and environmental infrastructure and analyze the economics, ecological and social impacts;
3. develop technological architecture concepts for typical smart city scenarios;
4. work with smart city data set and analyze the data to improve decision making in smart city context.

Indicative Literature

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

Usability and Relationship to other Modules

Concepts of Big Data Challenge as well as Business Intelligence will be applied

Examination Type: Module Examination

Assessment Type: Project report Length: 2,500 words
Weight: (100%)

Scope: All intended learning outcomes of the module

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

4.1.9 Artificial Intelligence in Business and Society for SCM

Module Name	**Module Code**	**Level (type)**	**CP**
Artificial Intelligence in Business and Society for SCM	MSCMO-201	Year 2 (CORE)	5

Module Components

Number	Name	Type	CP
MDSSBO-201-A	Artificial Intelligence in Business and Society Lecture	Lecture (online)	2.5
MDSSBO-201-B	Artificial Intelligence in Business and Society Tutorial	Tutorial (online)	2.5

Module Coordinator	**Program Affiliation**	**Mandatory Status**
Prof. Dr. Adalbert F.X. Wilhelm	• MSc Data Science for Society and Business (DSSB) (online)	Mandatory for SCM (online)

Entry Requirements			**Frequency**	**Duration**
Pre-requisites ☒ None	Co-requisites ☒ None	Knowledge, Abilities, or Skills • Profound knowledge in R	Annually (Fall)	1 semester

Student Workload

Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
35 h	17.5 h	50h	22.5 h	125 h

Recommendations for Preparation

Harvard Business Review (2019) Artificial Intelligence. HBSP: Boston, MA.

Content and Educational Aims

AI is one of the current key words that instills hopes for reshaping economies by promising to generate productivity gains, improve efficiency, and contribute to better lives. At the same time, AI is also fueling anxieties and ethical concerns about codifying and reinforcing existing biases and infringing human rights, along with exacerbating inequality, climate change, market concentration, and the digital divide. This module will give a historical overview of AI's evolution, from the development of symbolic AI in the 1950s to the recent achievements in machine learning. It will introduce the basic AI principles and algorithms applied to common problems, including search, optimization, planning, and pattern recognition. The module will discuss the economic landscape of AI and its role as a new general-purpose technology that can lower the cost of prediction and enable better decisions, hence resulting in cost savings and enabling better resource allocation for a variety of applications, such as transport, agriculture, finance, marketing and advertising, science, health, criminal justice, security, the public sector, and augmented/virtual reality. The module will also review salient policy issues that accompany the diffusion of AI.

The objective of this module is to enhance students with the fundamental technical skills and knowledge to plan, design, develop, and evaluate AI applications from a business and a societal viewpoint. Upon successful completion of the module, students will not only have a profound knowledge on common techniques and areas of AI, including problem solving, knowledge representation, reasoning, decision making, planning, perception and action, and learning, but will also be able to understand the implementation of the key components of intelligent agents with a moderate complexity.

The tutorial offers students the opportunity to ask questions, discuss content with their peers and to deepen their understanding of the material presented in the lectures.

Intended Learning Outcomes

Upon the completion of this module, students will be able to:

1. understand key terms and components in AI approaches
2. explain key methods and techniques for automated decision making
3. understand implementations of key components of AI systems
4. evaluate the potentials and threats induced by AI systems
5. appraise AI application areas
6. discuss salient policy issues stirred by AI systems

Indicative Literature

Agrawal, Gans, Goldfarb (2018) Prediction Machines. The Simple Economics of Artificial Intelligence. HBSP: Boston, MA

Cath, Wachter et al. (2017) Artificial Intelligence and the "Good Society": The US, EU, and UK approach. Science and Engineering Ethics 24, 505-528.

Usability and Relationship to other Modules

It builds on the general concepts of business intelligence and the Data Analytics in Supply Chain Management module. Its content can be used and transferred to the area of supply chain management and particularly be used in the master thesis module.

Examination Type: Module Examination

Assessment Type: Project Report Length: 3000 words
Weight: 100%

Scope: All intended learning outcomes of the module.
Completion: To pass this module, the examination has to be passed with at least 45%.

4.2 Research and Discovery Area (15 CP)

4.2.1 Applied Modeling & Simulation

Module Name Applied Modeling & Simulation			**Module Code** MSCMO-107	**Level (type)** Year 1 (Research and Discovery)	**CP** 5
Module Components					
Number	Name			Type	CP
MSCMO-107-A	Applied Modeling & Simulation			Lecture (online)	5
Module Coordinator NN	**Program Affiliation** • MSc Supply Chain Management (SCM) (online)			**Mandatory Status** Mandatory for SCM (online)	
Entry Requirements			**Frequency**	**Duration**	
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Fall)	1 semester	
☒ None	☒ Supply Chain Management and Logistics	• Basic software knowledge, analytical skills, verbal communication skills			

Student Workload				
Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
35 h	17.5 h	45 h	27.5 h	125 h

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 develop analytical methods that can be used to predict the system's behavior and any implementation of changes bears a great risk on the overall performance of the system. Simulations can be used to derive insight about the behavior of complex systems before changes are implemented. In this module, students will learn how to develop and conduct simulation experiments especially to analyze the behavior of complex supply chain systems.
Throughout the module, different aspects of supply chains, such as production and material flow along the supply chain, distribution networks, market diffusion, etc., will be modeled and simulated by applying discrete-event and agent-based modeling techniques.
Students will prepare assignments based on the created models and they will work on a final group project by dealing with a complex problem.

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. model highly dynamic supply chain systems
2. apply different simulation methods (esp. discrete-event and agent-based) to design and analyze processes;
3. independently investigate bottlenecks and inefficiencies in such complex systems;
4. analyze results of simulation runs and clearly communicate them to stakeholders;

5. independently find and evaluate alternative solution to bottlenecks and other issues in complex logistics systems by changing parameters and the overall system design;
6. make substantiated and data-based decisions by overseeing the impacts on the overall logistics system thanks to detailed simulation results;
7. justify their found solutions by using and communicating the optimal simulation result;
8. apply project management tools to effectively work in teams in order to solve complex problems in a group.

Indicative Literature

Borshchev, A., Grigoryev, I (2014): The Big Book of Simulation Modeling. Multimethod Modeling with AnyLogic 8. Lightning Source.

Usability and Relationship to other Modules

Aspects of Supply Chain Management and Logistics are foundational for modeling purposes. Communication and presentation skills taught in Communicating & Presenting 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

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

4.2.2 Supply Chain Engineering

Module Name	**Module Code**	**Level (type)**	**CP**
Supply Chain Engineering	MSCMO-108	Year 1 (Research and Discovery)	5

Module Components

Number	Name	Type	CP
MSCMO-108-A	Supply Chain Engineering	Lecture (online)	5

Module Coordinator	**Program Affiliation**	**Mandatory Status**
NN	• MSc Supply Chain Management (SCM) (online)	Mandatory for SCM (online)

Entry Requirements			**Frequency**	**Duration**
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Spring)	1 semester
☒ Supply Chain Management and Logistics	☒ None	• Basic knowledge in spreadsheet software		

Student Workload

Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
17.5 h	45 h	30 h	32.5 h	125 h

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

Upon completion of this module, students will be able to

Mathematical Modeling in SCM

1. develop mathematical models for supply chain management problems and derive optimal or near-optimal solutions to them using operations research methods;
2. 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

3. make decisions in a high-pressure environment as part of a team;
4. formulate and explain supply chain strategy and evaluate different suppliers and defend appropriate contract terms in a global supply chain environment;
5. design appropriate techniques for capacity planning in warehouses and production, inventory management and demand forecasting;
6. create supply chain risk management strategy to mitigate global supply chain risks;
7. construct a sustainable supply chain considering both economic and environmental factors;.
8. develop project management tools to effectively work in teams in order to perform a task.

Indicative Literature

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

Usability and Relationship to other Modules

Extends Supply Chain Management and Logistics by explicitly looking at design and control aspects of SCM. Communication and presentation skills taught in Communicating and Presentating facilitate the completion of tasks in this module

Examination Type: Module Examination

Assessment Type:
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

Type 1: Project Assessment (50%)

Scope: Intended learning outcomes of Integrated Decision-making

Type 2: Written Examination (50%)

Duration: 120 minutes

Scope: All intended learning outcomes of the module

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

4.2.3 Research Project

Module Name	**Module Code**	**Level (type)**	**CP**
Research Project	MSCMO-204	Year 2 (Research and Discovery)	5

Module Components

Number	Name	Type	CP
MSCMO-204-A	Research Project	Lecture (online)	5

Module Coordinator	**Program Affiliation**	**Mandatory Status**
NN	• MSc Supply Chain Management (SCM) (online)	Mandatory for SCM (online)

Entry Requirements			**Frequency**	**Duration**
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Fall)	1 semester
☒ None	☒ None	• Good verbal and written communication skills		

Student Workload

Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
17.5 h	17.5 h	45 h	45 h	125 h

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 as well, not only to prepare for their master thesis but also due to the fact that many graduates pursue an academic career. Thus, profound research skills as of utmost importance.

Content-wise, many industries are characterized by complex and highly interdependent supply stages. This raises issues of vertical and horizontal coordination, competition and market design as well as regulation. Picking up a specific example of such a complex industry, this module aims to step into the specific issues of value chain management, analyzing theoretical and practical issues from the viewpoint of economics and business administration.

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

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

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. write and review a research paper with an applied scientific background;
2. select and evaluate relevant literature;
3. assess the key arguments in the debate critically and independently;
4. develop an ability for a reasonable, reflecting, and stringent argumentation;
5. precisely communicate their ideas and views in a concise and clear manner on academic level;
6. precisely communicate ideas in discussions and presentations in class.

Indicative Literature

Usability and Relationship to other Modules

Supports the preparation of Master Thesis

Examination Type: Module Examination

Assessment Type: Term paper Length: 2,500 words
Weight: 100%

Scope: All intended learning outcomes of the module

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

4.3 Math and Methods Area (15 CP)

4.3.1 Programming in Python

Module Name Programming in Python			**Module Code** MSCMO-109	**Level (type)** Year 1 (Math and Methods)	**CP** 5
Module Components					
Number	Name			Type	CP
MSCMO-109-A	Programming in Python			Lecture (online)	5
Module Coordinator NN	**Program Affiliation** • MSc Supply Chain Management (SCM) (online)			**Mandatory Status** Mandatory for SCM (online)	
Entry Requirements Pre-requisites ☒ None	Co-requisites ☒ None	Knowledge, Abilities, or Skills • Logical thinking, analytical skills	**Frequency** Annually (Fall)	**Duration** 1 semester	

Student Workload				
Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
17.5 h	17.5 h	45 h	45 h	125 h

Recommendations for Preparation

Matthes, E. (2015): Python Crash Course: A Hands-On, Project-Based Introduction to Programming. No Starch Press.

Content and Educational Aims

Data analysis has become a central part of jobs in the supply chain industry. While routine tasks are often accomplished with standard spreadsheet software, more advanced analytical procedures require the use of programming languages. Python is one the most popular programming languages nowadays used by data analysts and data scientists. It has a broad spectrum of applicability, since Python has been designed as a general-purpose programming language. As open-source projects Python builds on a huge worldwide user and developer community, which has extended its capabilities. In this module, students will receive a solid introduction into this popular programming languages. SCM and logistics-related examples will be used throughout the module

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. apply and perform data handling and data manipulation tasks in Python;
2. apply their knowledge to implement code in Python;
3. know about typical applications of Python in data science.

Indicative Literature

Matthes, E. (2015): Python Crash Course: A Hands-On, Project-Based Introduction to Programming. No Starch Press.

Usability and Relationship to other Modules

Methods may be used in Data Analytics in Supply Chain Management as well as Master Thesis depending on the thesis topic.

Examination Type: Module Examination

Assessment Type: Term paper Length: 2,500 words
Weight: 100%

Scope: All intended learning outcomes of the module

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

4.3.2 Research Methods in SCM

Module Name	**Module Code**	**Level (type)**	**CP**
Research Methods in SCM	MSCMO-110	Year 1 (Math and Methods)	5

Module Components

Number	Name	Type	CP
MSCMO-110-A	Research Methods in SCM	Lecture (online)	5

Module Coordinator	**Program Affiliation**	**Mandatory Status**
NN	• MSc Supply Chain Management (SCM) (online)	Mandatory for SCM (online)

Entry Requirements			**Frequency**	**Duration**
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Spring)	1 semester
☒ None	☒ None	• Analytical skills		

Student Workload

Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
17.5 h	17.5 h	45 h	45 h	125 h

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 provides students with essential background in concepts and methods of econometrics beyond the introductory level. The module component will cover linear regression, regression for limited dependent variables, time series and panel data modelling. Given the widespread access to user-friendly and oftentimes open-source statistical software in present days, the course will provide a stronger emphasis on the underlying logic and limitations of the methods rather than their formal mathematical-statistical technicalities. It will thereby facilitate students in acquiring the background knowledge, skills, and intuitive understanding necessary for implementing and interpreting correctly quantitative research, particularly in the field of supply chain management.

Qualitative research, as the second component of this module, is concerned with meaning – for instance, the meaning that events have for people, or the meaning of written texts or works of art. By applying qualitative methods, researchers seek to obtain an in-depth understanding of these meanings. This module component examines the methodological foundations of qualitative research, introduces purposive sampling strategies that are especially suitable for an in-depth discovery of meaning, discusses how researchers acquire their data (for instance through interviews, focus groups, or observation), and reviews methods for the analysis of qualitative data (such as: various types of coding, content analysis, discourse analysis, visual analysis). Special emphasis is placed on examining the 'quality of qualitative research', including the extent to which the traditional criteria of objectivity, reliability, and validity can be applied. This component of the module is held in part as a seminar and in part as a lab where students apply the methods to data from their own fields of study. During the lab sessions, students are required to participate in and report on activities involving the application and trying out of selected methods. Also, students will develop, carry out, and report on small group research projects, fostering the integration of methodological knowledge about methods and designs with practical expertise in applying these methods. Lab sessions are run with small groups to ensure optimal supervision of research projects.

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. model and formulate complex logistics problems as mathematical equations;
2. apply operations research methods, i.e. mathematical models, to solve complex problems;
3. prepare and conduct qualitative research, such as interviews;
4. analyze and contextualize the findings of qualitative research.

Indicative Literature

Grolemund, G. (2014): Hands-On Programming with R: Write Your Own Functions and Simulations. O'Reilly and Associates

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Type: Term paper Length: 2,500 words
Weight: 100%

Scope: All intended learning outcomes of the module

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

4.3.3 Programming in R

Module Name Programming in R			**Module Code** MSCMO-205	**Level (type)** Year 2 (Math and Methods)	**CP** 5
Module Components					
Number	Name			Type	CP
MSCMO-205-A	Programming in R			Lecture (online)	5
Module Coordinator NN	**Program Affiliation** • MSc Supply Chain Management (SCM) (online)			**Mandatory Status** Mandatory for SCM (online)	
Entry Requirements Pre-requisites ☒ Programming in Python	Co-requisites ☒ None	Knowledge, Abilities, or Skills • Logical thinking, analytical skills	**Frequency** Annually (Fall)	**Duration** 1 semester	

Student Workload				
Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
17.5 h	17.5 h	45 h	45 h	125 h

Recommendations for Preparation

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

Content and Educational Aims

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

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. perform data handling and data manipulation tasks in R;
2. apply their knowledge to implement their own functions in R;
3. effectively use core packages and libraries of R for data analytic purposes
4. use typical applications of R in data science.

Indicative Literature

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

Usability and Relationship to other Modules

Methods may be used in Data Analytics in Supply Chain Management as well as Master Thesis depending on the thesis topic.

Examination Type: Module Examination

Assessment Type: Term paper Length: 2,500 words
Weight: 100%

Scope: All intended learning outcomes of the module

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

4.4 Career Area (15 CP)

4.4.1 Communicating and Presenting

Module Name Communicating and Presenting			**Module Code** MSCMO-111	**Level (type)** Year 1 (Career)	**CP** 5
Module Components					
Number	Name			Type	CP
MSCMO-111-A	Communicating and Presenting			Lecture (online)	5
Module Coordinator NN	**Program Affiliation** • MSc Supply Chain Management (SCM) (online)			**Mandatory Status** Mandatory for SCM (online)	
Entry Requirements Pre-requisites ☒ None	Co-requisites ☒ None	Knowledge, Abilities, or Skills • Verbal and written communication skills	**Frequency** Annually (Fall)	**Duration** 1 semester	

Student Workload				
Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
35 h	17.5 h	45 h	27.5 h	125 h

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 field of logistics and supply chain have to have good skills in both written and verbal communication. This module accounts for that need.
An executive career in an international business environment requires excellent communication and academic writing skills. Managers have to communicate effectively with a large variety of target audiences, often in different languages and with different cultural backgrounds. This is true for employees and/or direct reports, business partners as well as customers. The ability to present and communicate succinctly and confidently while being culturally aware building rapport and trust with different audiences is crucial. In this interactive module, students will be introduced to the basics of effective presentation and communication techniques. They will learn how to present themselves, their business project, or academic work, with impact, tailoring both the content and their delivery style to different types of audiences

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. apply methods to act as effective communicators – in both group and individual situations;
2. integrate interpersonal communication models and group dynamics in presentations;
3. build rapport and trust with audiences;
4. use presentation software (Power point, Prezi) confidently and in a visually pleasant way;
5. structure presentations in a coherent manner and develop captivating narratives;
6. work with different presentation formats (Ignite, Pecha Kucha, Pitching etc.);
7. apply the basics of logical reasoning in oratory (deductive/inductive) presentations;

8. develop oratory and rhetorical skills drawing on Aristotle's teaching of logos, ethos and pathos;
9. apply the basics of interpersonal communication (Johari Window, 4-Ears model etc.);
10. give and receive constructive feedback;
11. present themselves in different business situations;
12. collaborate effective in intercultural teams.

Indicative Literature

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

Usability and Relationship to other Modules

This module is foundational to several modules where presentations and term papers are expected, such as Big Data, Trends & Challenges in SCM, Purchasing & Distribution, Data Analytics in SCM, Smart Cities and Transport. Concepts, Supply Chain Engineering and Master Thesis.

Examination Type: Module Examination

Assessment Type: Presentation Duration: 60 minutes
Weight: 100%

Scope: All intended learning outcomes of the module

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

4.4.2 Business Ethics

Module Name Business Ethics			**Module Code** MSCMO-112	**Level (type)** Year 1 (Career)	**CP** 5
Module Components					
Number	Name			Type	CP
MSCMO-112	Business Ethics			Lecture (online)	5
Module Coordinator NN	**Program Affiliation** • MSc Supply Chain Management (SCM) (online)			**Mandatory Status** Mandatory for SCM (online)	
Entry Requirements			**Frequency** Annually (Spring)	**Duration** 1 semester	
Pre-requisites ☒ None	Co-requisites ☒ None	Knowledge, Abilities, or Skills • Verbal and written communication skills			

Student Workload

Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
17.5h	17.5h	45h	45h	125 h

Recommendations for Preparation

Ferrell, O.C.; Fraedrich, J.; Ferrell, L. (2018): Business Ethics: Ethical Decision Making & Cases, Cengage Learning, 12th Edition

Content and Educational Aims

This module will address ethical issues, norms and values in business life with a special focus on Germany. Ethics or morality have to do with 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 relationship, and the proper use of power and authority. So, ethical principles, rules and regulations with a special emphasis on Germany will be dealt with.
Specific topics are ethical principles concerning business, sustainability and digitalization, i.e. data security and privacy, etc., as they relate to supply chain management in a global setting are a useful and potentially critical component to prepare future professionals to be effective contributors to a company or society

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. proactively deal with a number of different topics as they relate to the ethics in supply chain management in Germany;
2. assess the economic implications of ethical/unethical behavior on the success and growth of a business;
3. deal with legal aspects of ethics by applying means to prevent and deal with corruption and accountability, especially in Germany;
4. apply actions to contribute to the transition to a more ethical business as part of their job
5. implement and defend justice and social equality as dimensions of Ethics

Indicative Literature

Ferrell, O.C.; Fraedrich, J.; Ferrell, L. (2018): Business Ethics: Ethical Decision Making & Cases, Cengage Learning, 12th Edition

Usability and Relationship to other Modules

Methods may be used in Master Thesis depending on the thesis topic

Examination Type: Module Examination

Assessment Type: Term paper Length: 2,500 words
Weight: 100%

Scope: All intended learning outcomes of the module

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

4.4.3 Business in Germany

Module Name Business in Germany			**Module Code** MSCMO-206	**Level (type)** Year 2 (Career)	**CP** 5
Module Components					
Number	Name			Type	CP
MSCMO-206-A	Business in Germany			Lecture (online)	5
Module Coordinator NN	**Program Affiliation** • MSc Supply Chain Management (SCM) (online)			**Mandatory Status** Mandatory for SCM (online)	
Entry Requirements Pre-requisites ☒ None	Co-requisites ☒ None	Knowledge, Abilities, or Skills • Basic knowledge in German	**Frequency** Annually (Fall)	**Duration** 1 semester	

Student Workload				
Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
17.5 h	17.5 h	45 h	45 h	125 h

Recommendations for Preparation

Siebert, H. (2005): The German Economy: Beyond The Social Market. Princeton University Press

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.
So, there will a focus on current topics in the German economic ecosystem. It helps students orientate themselves within Germany and understand the German business culture and landscape. Germany is an important logistics hub and many international companies are present in the German market. Therefore, besides a solid command of the German language good knowledge about its economy and institutions will prepare students of SCM (online) both for a career within Germany as well as for an international career dealing with German suppliers and customers. Content-wise, the evolution and the historical backdrop of the German economy, starting with the German "Wirtschaftswunder" to the European integration with the implications for the economy and business life will be taught. Additionally, the current complex business landscape in Germany with the major institutions and their relationships will be addressed. Then, on a corporate level, company-related structural aspects, such as legal forms and their pros and cons will be discussed. This is also important for starting a business in Germany. All information is intended to embed students' and graduates' lives in Germany into contexts specific to the country. If feasible, parts of the component are conducted in German.

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. analyze and interpret economic developments in Germany
2. Understand the effects of overall economic developments on business operations.
3. Analyze and, in the case of starting a business, find the proper legal form for a company;

Indicative Literature

Siebert, H. (2005): The German Economy: Beyond The Social Market. Princeton University Press

Usability and Relationship to other Modules

Methods may be used in Master Thesis depending on the thesis topic

Examination Type: Module Examination

Assessment Type: Term paper Length: 2,500 words
Weight: 100%

Scope: All intended learning outcomes of the module

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

4.5 Master Thesis (30 CP)

Module Name	**Module Code**	**Level (type)**	**CP**
Master Thesis SCM (Online)	MSCMO-300	Year 2	30

Module Components

Number	Name	Type	CP
MSCMO-300-T	Thesis	Thesis	30

Module Coordinator	**Program Affiliation**	**Mandatory Status**
NN	• MSc Supply Chain Management (SCM) (online)	Mandatory for SCM (online)

Entry Requirements			**Frequency**	**Duration**
Pre-requisites	Co-requisites	Knowledge, Abilities, or Skills	Annually (Spring)	1 semester
☒ Successful completion of at least 75 CP	☒ None	• Proficiency in the area of the chosen thesis topic		

Student Workload

Asynchronous Self Study	Interactive Learning	Assessment Preparation	Independent Study	Hours Total
10h	15 h	25 h	700 h	750 h

Recommendations for Preparation

- Identify an area or a topic of interest and contact potential supervisors
- 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 provides an opportunity for students to develop their interests in a specific subject area or specialization, and to demonstrate their ability to undertake independent research.

The selected topic of the thesis, as well as the approach must be related to a Supply Chain Management problem of current interest.

The thesis work comprises the full cycle of a scientific research endeavor: (i) identifying a relevant open research question, (ii) carrying out a literature survey to put the planned work in its context and relate it to the state of the art (SoA), (iii) formulate a concrete research objective, (iv) design a research plan including a statement of criteria to evaluate the success of the project, (v) carry out the plan (with the possibility to change the original plan when motivated), (vi) document the results, (vii) analyze the results with respect to the SoA, the original objective, and the success criteria, and (viii) document all of this in a thesis report. All of this work should be done with as much self-guidance as can be reasonably expected. The instructor will likely give substantial guidance for (i) and (iii), whereas the other aspects will be addressed with larger degrees of self-guidance.

Seminar:
The thesis will be accompanied by a research seminar where students have to present their thesis projects in an appropriate form to other fellow students as well as to the thesis supervisors and their research groups to get feedback and further impulses. Before submitting the final version of their master thesis they have to defend their thesis in an oral examination to their thesis supervisors.

The module achievement will be the thesis proposal. In the first weeks the students need to attend a tutorial on scientific working standards and scientific writing. A project proposal document has to be prepared and submitted after 4 weeks, outlining the master thesis project milestones, with target length 10 pages, including references.

Intended Learning Outcomes

Upon completion of this module, students will be able to

1. independently develop research questions guided by gaps in existing knowledge and determine appropriate research strategies and plans;
2. independently choose and justify appropriate research methods to new unsolved problems or issues;
3. critically assess scientific results and literature;
4. summarize the current state of knowledge in their chosen specialization area;
5. independently apply appropriate knowledge, methods and competencies acquired during their studies;
6. develop conclusions based on their own analysis;
7. use individual feedback to develop and mature within the field of their specialization;
8. effectively communicate and discuss their research results to various audiences;
9. take into consideration social and ethical consequences of their activities.
10. Formulate a research project proposal.
11. presentation of project results for specialists and non-specialists.

Indicative Literature

N. A.

Usability and Relationship to other Modules

Examination Type: Module Examination

Assessment Component 1: Thesis

Length: 30-50 pages
Weight: (80%)

Assessment Component 2: Oral Examination (Master Thesis Defense)

Duration: 15-30 minutes
Weight:(20%)

Module Achievement: Completion of proposal and proposal presentation are pre-requisites prior to the submission of the thesis.

Scope: All intended learning outcomes of the module

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

5 Appendix

5.1 Intended Learning Outcomes Assessment Matrix

MSc Supply Chain Management (online)					Business Intelligence	Supply Chain Management and Logistics	Big Data Challenge for SCM	Trends & Challenges in SCM	Advanced Supply Chain Management	Purchasing & Distribution	Data Analytics in Supply Chain Management	Smart Cities and Transportation Concepts	AI in Business and Society for SCM	Applied Modeling and Simulation	Supply Chain Engineering	Research Project	Programming in Python	Research Methods in SCM	Programming in R	Communicating and Presenting	Business Ethics	Business in Germany	Master Thesis MSc SCM
Semester					1	1	1	2	2	2	3	3	3	1	2	3	1	2	3	1-2	3	3	4
Mandatory/ Mandatory elective					m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
ECTS Credits					5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	30
	Competencies*																						
Program Learning Outcomes	**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
integrate new knowledge in complex supply chain contexts based on extensive data analytics;	x				x	x	x	x	x		x	x	x				x	x	x				x
assess opportunities and risks in global supply networks;	x	x			x	x	x	x			x		x										x
Make scientifically substantiated and data-driven decisions in the context of SCM and logistics and critically reflect possible impacts on business, environment and society;	x	x		x	x		x	x	x	x	x	x	x	x			x	x	x		x		x
independently investigate complex problems and develop new knowledge using both qualitative and quantitative methods;	x	x			x		x	x		x		x	x	x		x	x	x	x				x
apply interdisciplinary approaches to solve academic and professional problems;	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	
manage multicultural and diverse environments and effectively participate in and lead mixed teams;		x						x		x			x	x	x				x	x	x	x	
use individual feedback on a continuous basis to develop and mature within their studies and beyond;			x					x					x			x				x	x	x	x
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
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
adhere to and defend ethical, scientific and professional standards.	x	x	x	x									x			x				x	x	x	x
Assessment Type																							
Oral examination																							x
Written examination						x									x								
Project assessment															x								
Project report					x		x	x	x		x	x	x	x									
Practical assessment																							
Term paper										x						x	x	x	x		x	x	
Laboratory report																							
Poster presentation																							
Presentation																				x			
Thesis																							x
Module Achievements																							x

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

Figure 3: ILO Assessment Matrix