JÖNKÖPING UNIVERSITY
School of Engineering

PROGRAMME SYLLABUS
Preliminary, not confirmed

Supply Chain Operations Management (master), 120 credits

Supply Chain Operations Management (master), 120 högskolepoäng

Programme Code:	TASC5	Programmestart:	Autumn 2028
Confirmed:		Education Cycle:	Second-cycle level

Title of Qualification

Degree of Master of Science (120 credits) with a major in Production Systems specialisation in Supply Chain Operations Management

Teknologie Masterexamen med huvudområdet Produktionssystem inriktning Supply Chain Operations Management

Programme Overview

Main field of study

The main field of study production systems includes the scientific study of organization, processes and technology for the production of products. Production systems include the technology, people and organization needed to turn an identified customer need for goods and associated services into reality. Focus in the main field of study is on development, operations and management of production systems, integrated with other relevant processes in organizations active on a regional, national or global market. Within the main field of studiy theories concerning production engineering, production system development, integrated product- and production development, quality management, logistics and supply chain management, are combined with theories on organization and operations management.
The studies in the field are based on a holistic view on production and its interaction with the entire product realization process, including the interface with customers and suppliers. Economic, social and environmental aspects are considered. A system perspective is applied, using both quantitative and qualitative approaches. Studies within the main field of study aim at deep understanding and knowledge of central elements of a production system, its development, operations and management. Knowledge and skills required for development, operations and management of globally competitive production systems are aimed at.

Background

The operations function and its role in supply chain networks is of vital importance for organizations, be it in the manufacturing or service industry, to remain competitive in today's rapidly changing and expanding global markets.
Supply chain operations management is a field that has grown rapidly over the recent decades, both in research and practice. The strategic role operations play for businesses to remain competitive has been further demanded through forward technological leaps and contemporary solutions of connecting sites and parties, both internally and externally, around the world. As consumption continue to increase and products are often transported over lengthy distances, sustainable solutions are key in supply chain operations. This programme is designed to provide competencies in supply chain operations management by integrating supply chain management, operations management, industrial engineering and work organization. The interdisciplinary approach of this programme offers unique opportunities to learn, practice, and gain appropriate knowledge and skills to manage integrated systems in directing, designing and developing sustainable operations for network-based delivery of products and services. Throughout the education, extensive experience is gained in problem-based learning where real-life issues are incorporated, while practicing constant application of communication and presentation skills in various decision-making constellations.

Objectives

The programme aims to prepare students for managerial work in changing, dynamic supply chain

operations environments and provide competences to identify and manage the balance between efficiency requirements on daily operations, the need for innovative aspects of renewal and the demands for lasting sustainability. Further, there is an emphasis on the understanding of the implications of digitalization and connectivity for supply chain operations management.
Moreover, the programme also prepares students for postgraduate studies, and careers within various areas demanding knowledge and skills in research.

Post-graduation employment areas

Graduates will be highly skilled engineers with extensive knowledge on supply chains and operations of the future markets, with the ability to maneuver within a sustainable, complex, digitalized, global system as operations managers, industrial engineers, or supply chain managers. Further, graduates will be equipped with academic know-how in conducting research, managing projects, and collaborating effectively in interdisciplinary settings. This shall create suitability to be employed by research institutes, universities and within research and development functions.

Objectives

Common learning outcomes

After the completion of the programme, students must meet the intended learning outcomes, as described in The Higher Education Ordinance by Degree of Master, and also the intended learning outcome, as described by JTH:

Knowledge and Understanding

1. demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work
2. demonstrate specialised methodological knowledge in the main field of study

Competence and skills

3. demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information
4. demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work
5. demonstrate the ability in speech and writing both nationally and internationally to clearly report and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences
6. demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity

Judgement and Approach

7. demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work
8. demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used
9. demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning

JTH. prove ability to embrace interdisciplinary approaches.

Programme-specific learning outcomes

Upon completion of the programme, the intended learning outcomes provided for programme must also be met.

Knowledge and Understanding

10. display knowledge of implications of digitalization and connectivity for supply chain operations management
11. demonstrate comprehension of the characteristics of operations management and its role in supply chain contexts
12. demonstrate comprehension of the balance between efficiency requirements on daily operations and the need for innovative aspects of renewal and innovation

Competence and skills

13. demonstrate skills of problem identification, analysis and decision making within supply chain operations management contexts
14. demonstrate skills of operations management in practice
15. demonstrate the ability to apply different methods and tools relevant for supply chain operations management
16. demonstrate the ability to understand interactions among individuals, groups, organizations and

technology in supply chains
17. demonstrate the ability to lead, participate and collaborate effectively in teams toward goals

Judgement and Approach

18. demonstrate the ability to critically analyze the impact operations has on economic, social, and environmental sustainable development
19. demonstrate the ability to critically reflect on differences and similarities in process and system perspectives on operations management.

Contents

Programme principles

The education encompasses deep expertise in directing, designing and developing sustainable supply chain operations for delivery of products and services (based on the so-called 4D-model of operations management). In relation to this, emphasis is put on integrating aspects of sustainability, and digitalisation and connectivity, into every course, along with a problem-based learning approach. Moreover, communication and presentation skills are at the core of every managerial position and therefore a vital part of the educational programme in supply chain operations management.

During the first year all courses are programme specific and follow two paths. The first path focuses on core aspects of supply chain operations management and offers a solid basis for continued post-graduate studies. The courses in this path build on each other based on the 4D-model for operations management; covering issues related to how to direct, design and develop operations, and how to ensure efficient and effective delivery of products and services. The second path runs in parallel with the first and consists of courses on research methodology and on how to lead people, systems, and processes. The combination of these two paths gives that the programme provides an in-depth understanding of the knowledge, skills, and abilities needed to manage operations in a supply chain context.

The second year provides a unique opportunity for the students to tailor their own specific competence profile by taking elective courses either at JU or at our international campuses or partner universities. Students can further specialize in the area of their preference within the main field of study; production systems. During the final semester the students conduct the final project work, at JU, an industrial company, or one of the international campuses.

During the programme, students work on practical cases where they apply their theoretical knowledge in dealing with real-world problems. Case seminars, literature seminars, exercises, laboratory work, and business games are educational tools that are used to facilitate understanding of the contemporary management of supply chain operations. Group work is very common and gives the students an opportunity to practice their skills and abilities in collaborating interdisciplinary. A fundamental principle of the programme is for students to have the opportunity to link theory to industrial practice. Therefore, it is particularly important that students apply the knowledge they have acquired during their studies. Thus, a substantial part of the studies is done as projects, in which theories, models, methods, and tools about which students have acquired knowledge are applied in projects covering industrial problem issues. The projects are firmly founded in real problem issues in different types of organizations. In several courses, field trips are organized or guest speakers from industry are invited to further strengthen the link between education and practice.

Education in this international programme is carried out in English and English is the language used for all communication among teachers and students.

Research basis

The education is firmly grounded in research within supply chain operations management, where related theoretical perspectives and concepts are the foundation for the learning activities. The students are given the opportunity to understand the classics and the seminal works within the field, at the same time as recent results and upcoming research trends, both from the international research frontier and from the collaborative research conducted at the School of Engineering, are included in the programme courses.

The programme is designed to relate to several research areas of the department of Supply Chain and Operations Management. All course coordinators and examiners in the programme are researchers engaged in a variety of research projects. Therefore, all courses contain insights and examples of cases from ongoing or completed research projects. This implies that the programme offers relevant knowledge, providing students with insights into cutting-edge research development. In particular, the programme is deeply linked to the department's research education topic Industrial engineering and management, and the study of organizing and flow aspects in socio-technical systems in industrial organizations for manufacturing of physical products, associated services and other types of services. Supply Chain and Operations

Management researchers also contribute to education in terms of their extensive international networks creating opportunities for guest lectures, case analyses, and information exchange.

Equal terms, gender equality and diversity

The School of Engineering (JTH) strives in all its activities to ensure that all individuals are given equal opportunities and treated equally. At both the JU and JTH levels, this is reflected in governing documents concerning organizational and personnel matters, the establishment and delivery of programmes and courses, as well as the monitoring of educational quality. At JTH, student influence is also ensured through student representation in various educational and industry councils.

The Master's programme in Supply Chain Operations Management is committed to fostering an inclusive and equitable learning environment. This commitment is reflected in several key aspects of the programme. The programme ensures that all students have equal access to learning opportunities and resources. This is achieved through Inclusive Curriculum designed to be accessible to students from diverse backgrounds, ensuring that all students can engage with the material, along with a range of support services made available to assist students in overcoming any barriers to their education, including academic advising, tutoring, and career counseling.

The programme actively promotes gender equality through both balanced representations where efforts are made to ensure balanced gender representation among students, faculty, and guest speakers, and gender-sensitive content where course content includes discussions on gender issues in supply chain operations, highlighting the importance of gender diversity in leadership roles and decision-making processes.

Diversity is a core value of the programme. The programme incorporates cultural competence training to prepare students to work effectively in diverse, global environments. This includes understanding and respecting different cultural perspectives and practices. Further, students are exposed to diverse learning environments through international case studies and exchange opportunities. This helps students appreciate and leverage diversity in their professional lives.

By integrating these principles into its structure, the master's programme in Supply Chain Operations Management not only prepares students for successful careers but also ensures they are equipped to contribute to a more equitable and inclusive society.

Study abroad

JTH has internationalization as a focus area where the educational programmes include opportunities for both international experiences at home as well as various opportunities to do internships and study abroad, giving students valuable experiences and skills to prepare them for a global labour market.

Students are given the opportunity to study abroad during the second year of the programme.

Programme progression

The programme courses, goals and progression are continuously assessed. The programme is based on a system-wide perspective, which means that (1) knowledge and understanding, (2) the skills and abilities, and (3) judgement and approach are built up continuously during the programme. Each course is part of the system and provides all three levels of knowledge and for the whole programme, the students have knowledge of the entire system at all three levels. Examination takes place in different forms in different courses continuously during the programme with progressively higher requirements as the courses follow. Final examination takes place in the form of the master's thesis.

The academic year consists of four study periods and during each period two courses are read in parallel. The programme starts with the course *Introduction to Supply Chain Operations Management*. The main purpose of this course is to give students from a variety of backgrounds the opportunity to understand the concepts upon which supply chain operations are built and to initialize their own problem-based learning and abilities to collaborate in interdisciplinary settings. In parallel, the course *Research Methodology on Advanced Level*, takes place. This course emphasizes skills and abilities needed to conduct research studies in supply chain operations but also focuses on writing skills and the ability to search and analyse information. During the second study period the course *Operations Strategy and Innovation* and the course *Designing Supply Chain Operations* take place. These are continuations of the Introduction course and further adds to the specialized knowledge in how to direct and design supply chain operations.

The second semester of the first year starts with the course *Deliver: Strategy, Planning and Operations*. This course offers deep knowledge of the planning and control of supply chain operations and is a continuation of the courses *Operations Strategy and Innovation* and *Designing Supply Chain Operations*. In parallel, the first course related to leading operations starts: *Leading Sustainable Operations.* In this course emphasis is put on interpersonal communication, diversity and group dynamics, and social sustainability. During the fourth study period this course is followed by *Leading Advanced Socio-technical Systems*. Here, the interplay

among man and machine is emphasised by focusing on human-centred management of machine learning and artificial intelligence, contradictions and interdependencies, and leadership in complex situations. In parallel, during the fourth study period, the course *Developing Sustainable Supply Chain Operations* take place. This course focuses on development, as well as continuous improvements, of sustainable operations. It covers a variety of tools and techniques and put great emphasis on total quality management.

The second year consists of an elective semester (semester three) and the final project work (semester four). The third semester consists of several different tracks to choose from, giving students the opportunity to build a custom-made profile with respect to their own interests. The first track consists of the course *Lean and Six Sigma for Sustainable Operations* (15 credits). This is an interdisciplinary course offering the opportunity to deepen the knowledge of lean and six sigma, respectively and combined. The course includes a six sigma project. The second track is primarily focused on deepening the students' knowledge on how to conduct research and preparing them for future research careers. It includes two courses: *Research track: Research Placement in Supply Chain Operations Management* (7,5 credits) and *Research track: In-depth Project Work in Supply Chain Operations Management* (7,5 credits). Both courses are conducted in close collaboration with researchers, primarily from the department of Supply Chain and Operations Management, and industrial partners involved in research projects focusing on co-production. Should more students than there are available projects elect the course, it is up to the examiner to distribute the places. This is done based on a combined assessment of the students' progress during the first year of studies and fit with the specific topic of the project. The third track is a collaborative, interdisciplinary course, *Project course* (15 credits), gathering students from the fields materials and manufacturing, product development, production engineering, and supply chain operations management in a project work focusing on technical and scientific problems in an applied industrial context related to product realization. The fourth track focuses on broadening the knowledge related to product and production development. It consists of the course *Production System Development* (7,5 credits) which is followed by the course *Integrated Product and Production Development* (7,5 credits). The fifth track focuses on sustainability and digitalization. It includes two courses, *Circular Economy* (7,5 credits) and *Simulation in Industrial Engineering* (7,5 credits).

The students admitted to the programme having 15 credits mathematics must take a 7.5 credits course in mathematics to obtain a Master of Science degree.

For those seeking to add further international experience to their portfolio, there is the opportunity to go abroad during the third elective semester. JU and the School of Engineering collaborate with several partner universities and offer several international campuses. Students who go abroad during this semester are required to take courses equivalent to 30 credits within the main field of study. The recommendation is to select courses within the specialisation, but some complementary topics might be relevant, given students' personal preferences and career plans. Students choose the courses in coordination with the School of Engineering faculty, and accreditation of the courses is conducted by the programme director.

The fourth semester is dedicated to the final project work which provides further scope and depth to knowledge within the main field of study. Further, it allows the students to independently carry out research projects by the support from dedicated supervisors. When writing up the final project work report the student uses the knowledge and experience gained during the programme to conduct research within supply chain operations management, making assessments where relevant scientific, societal and ethical issues are taken into account, and where the students are able to demonstrate awareness of sustainable development.

Courses

Course changes can occur, as long as they do not substantially affect the programme's content and learning goals.

Mandatory Courses

Semester	Course Name	Credits	Main field of study	Specialised in	Course Code
1	Research Methodology on Advanced Level	7.5	Product Development, Production Systems	A1N	T2FPAN
1	Introduction to Supply Chain Operations Management	7.5	Production Systems	A1N	TISR21
1	Operations Strategy and Innovation	7.5	Production Systems	A1F	TOSS21
1	Designing Supply Chain Operations	7.5	Production Systems	A1F	TSCS21
2	Leading Advanced Socio-Technical System	7.5	Production Systems	A1F	TATS22
2	Deliver: Strategy, Planning and Operations	7.5	Production Systems	A1F	TDSS22

2	Leading Sustainable Operations	7.5	Production Systems	A1N	TSOR22
2	Developing Sustainable Supply Chain Operations	7.5	Production Systems	A1F	TSSS22
3	Possibility to study abroad	30			
4	Final Project Work in Production Systems	30	Production Systems	A2E	TEUT23

Elective Courses

Semester	Course Name	Credits	Main field of study	Specialised in	Course Code
3	Production System Development	7.5	Production Systems	A1N	T2UAPD
3	Circular Economy	7.5	Production Systems	G2F	TCEN14
3	Lean and Six Sigma for Sustainable Operations	15	Production Systems	A1F	TLXS22
3	Mathematics for Intelligent Systems	7.5		A1N	TMAR21
3	Project Course	15	Product Development, Production Systems	A1N	TPJS22
3	Integrated Product and Production Development	7.5	Product Development, Production Systems	A1N	TPPR25
3	Research Track: In-depth Project Work in Supply Chain Operations Management	7.5	Production Systems	A1F	TRES22
3	Research Track: Research Placement in Supply Chain Operations Management	7.5	Production Systems	A1F	TRRS24
3	Simulation in Industrial Engineering	7.5	Industrial Engineering and Management	G2F	TSEP11

Teaching and Examination

The academic year is divided into two semesters, and the semesters into two study periods. In each study period two courses are generally taken in parallel. Assessment is part of each course or module. Modes of assessment and grades are shown in each course syllabus.

Entry Requirements

The applicant must hold the minimum of a bachelor’s degree (i.e the equivalent of 180 ECTS credits at an accredited university) in engineering or technology. The bachelor’s degree should comprise a minimum of 15 credits in mathematics. Proof of English proficiency is required.

Continuation Requirements

In order to begin the second year, at least 37,5 credits from the programme's first year must be completed.

Qualification Requirements

To obtain a Degree of Master of Science (120 credits) with a major in Production Systems, specialisation in Supply Chain Operations Management, students must complete a minimum of 120 credits in accordance with the current programme syllabus, at least 60 credits of which must be in the main field of study Production Systems and 21 credits in Mathematics.
In addition a Degree of Bachelor of Science in Engineering/Degree of Bachelor of Science or an equivalent Swedish or foreign qualification is required.

Quality Development

At JTH, systematic quality assurance is carried out within JU's established quality system. This system, based on the requirements of the Higher Education Act, the Higher Education Ordinance, and the *Standards and Guidelines for Quality Assurance in the European Higher Education Area,* has been reviewed and approved by the Swedish Higher Education Authority.

Active and continuous course evaluation, including student feedback through course surveys, forms one of the cornerstones of this system. Annual programme evaluations and student representation in JTH's various

educational and industry councils are two additional examples.

Other Information

Admission is under ‘Admission regulations for first- and second cycle courses and study programmes at Jönköping University (Admission regulations)’.

This syllabus is based on ‘Regulations and guidelines for first-, second- and third-cycle education at Jönköping University’.