

LOGISTICS & SUPPLY CHAIN MANAGEMENT (LSCM)

LSCM 601 Research Ethics and Methods **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

This LSCM core course prepares students for performing graduate level research. It introduces students to multi-disciplinary methods for critical exploration of research, locating and summarizing and critiquing relevant literature, developing a research problem, framing a problem with an appropriate research method, and constructing a coherent research design. One focus will be on an introduction to ethics and ethical misconduct. Throughout the course, students will be developing a causal model, will be acquainted with peer review, and will be developing a research proposal.

LSCM 605 The Pricing of Financial Contracts **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

This course serves as an introduction to financial markets, the models of risky assets and the theory of pricing contracts based on these assets. The course exhibits the basic features of financial derivatives. These instruments are defined, their payoffs and the markets in which they are traded are considered, and the importance of valuing these instruments in the absence of arbitrage is discussed. The course will provide students with a thorough understanding of the mechanics of financial markets.

LSCM 607 Optimization Models and Methods **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

This course covers a thorough understanding of optimization methods and models. On successful completion of the course, students will be able to: define and formulate linear programming problems and appreciate their limitations; solve linear programming problems using appropriate software and computer packages, and interpret the results obtained; conduct and interpret post-optimal and sensitivity analysis; and explain the primal-dual relationship. Moreover, students will be able to formulate and solve a wide range of traditional logistics and supply chain combinatorial problems. Students will also be exposed to some well-known advanced optimization techniques that might be covered in other electives.

LSCM 611 Supply Chain Management **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

This course aims at showing that any organization must be analyzed as a component of a Supply Chain in which the different actors (suppliers, manufacturers, retailers) as well as the different functions (marketing, production, finance) interact. Understanding and mastering the relationships between these different areas will improve the effectiveness (achieving the objectives) and the efficiency (achieving the results at least cost) of the system.

LSCM 617 Production and Operations Management **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

Production & Operations Management is defined as the set of processes which transform the inputs/resources of an organization into final goods /services through a set of defined, controlled and repeatable policies. This course covers a thorough understanding on managerial processes for effective operations in both goods-producing and service-rendering organization. Emphasis is on specific tools and strategies used to manage and enhance a firm's operations and production, such as Inventory management, Demand forecasting and Production Planning and Scheduling. The course will also introduce simulation modelling to solve complex operations management problems.

LSCM 621 Project Management in Logistics **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

This course prepares students for managing projects, with a special focus on large-scale projects for logistical infrastructures in aviation and shipping (i.e. airports and seaports). Part 1 will focus on managing large-scale projects. Here, essentials about the concept of project management will be presented and discussed from a business administration point of view. Part 2 will apply these methodological essentials to projects for logistical infrastructures in aviation and shipping.

LSCM 625 Behavioral Logistics Management **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

The course focuses the students on being able to explain, rather than to only describe, approaches to strategic challenges of logistics management. Here, there are no uniform solutions. Complexity and causality are two constructs to be dealt with in strategic logistics management. The conceptualization and analysis of cause-effect-cause systems is critical for decision-making. Therefore, quantitative approaches as well as qualitative approaches (i.e. focusing on the behavior) are elements of decision making for strategic challenges.

LSCM 627 Simulation Optimization Methods **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

The course introduces decision support systems based on simulation optimization methods to solve complex problems by finding better input values of continuous and discrete variables from among all possibilities without explicitly evaluating each possibility. Simulation optimization methods aims to minimize solving resources spent while maximizing the information obtained in a simulated or measured experiment. Major difficulties from lack of analytical formulation, presence of uncertainties, nonlinearities, non-differentiable functions, very expensive and time-consuming optimized solutions force the use of simulation-based optimization approaches when solving multi-scope, multi-scale and multi-scenario problems as those found in industrial manufacturing and supply chains.

LSCM 631 Port Management and Maritime Logistics **3 Credits**
Grade Mode: Standard Letter, Audit/Non Audit

The course examines how ports are organized, managed and planned, and how ports interface with the logistics chain. The course provides necessary knowledge and understanding of the principles and evolution of container terminal management, port indicators, maritime supply chain management and environmental issues that arise from port operations and maritime transportation.

LSCM 635 Business Performance Management**3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

This course focuses on interdisciplinary approaches to financial and operational performance measurement and management. The course emphasizes an exploratory- and explanatory-focused approach in that students develop case studies. In order to build these on a framework, the course introduces the conceptual approaches to performance management with an emphasis on logistical systems. The course highlights the current research in the management domain. Both, the theoretical and the research parts are aimed at building the framework for students to built their cases.

LSCM 641 Facility and Transportation Management**3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

This course is emphasizing on applying industrial engineering principles and techniques to analyze, design and improve facility layout and transportation networks in industrial enterprises and services systems. In addition to bringing together the knowledge gained in many previous courses, the topics of this course include tools and methods for planning new facilities and transportation networks and to revise or expand existent ones.

LSCM 651 Financial Techniques for Investment Appraisal**3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

The course introduces students to basic mathematical models for assessing investments and projects taking place over a period of time. The course explains how concepts of compound interest and discounting are used to value payments to be made in the future. Compound interest functions are introduced and formulae for regular or varying payments made for specified periods are derived. Practical applications are demonstrated by analysing problems relating to investments such as bonds and ordinary shares.

LSCM 671 Principles of Reinforcement Learning for Engineering Management**3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

The course will introduce the Principles of Reinforcement Learning (RL) for Engineering Management. Starting from the basics of Markov Decision Processes (MDP) the course will cover a broad set of techniques including Value Iteration, Policy Iteration, Q-Learning, Policy Gradient, Actor-Critic Methods. The use of function approximation techniques (including Neural Networks) to approximate the state-space will be elaborated. Applications from Traffic Management, Logistics and Supply Chains will be introduced to apply theory to practice.

LSCM 690 Applied Project**1-6 Credits**

Grade Mode: Pass/Non Pass

Fulfilling curriculum requirements in the form of an applied industrial project

LSCM 695 Master's Thesis Hours**1-6 Credits**

Grade Mode: Pass/Non Pass

Fulfilling curriculum research requirements.

LSCM 701 Research Seminar**0 Credits**

Grade Mode: Pass/Non Pass

The LSCM research seminars will consist of industrial professionals and academics in the field of logistics and supply chain management. The objective of which is to expose participants to the latest trends in research and industrial practices within logistics and supply chain management.

LSCM 706 Independent studies**3 Credits**

Grade Mode: Standard Letter

This course offering is designed to enable independent studies by student in special topics.

LSCM 711 Supply Chain Modeling and Optimization**3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

This course will review the major supply chain innovations developed over the last four decades. The course is specifically designed to address the issue the decision making processes of the dynamic complexities within supply chains using modeling and optimization approaches. These innovations have transformed tremendously supply chains especially through Information Technology and digitalization enablers. Most of the modeling will be performed using basic tools such as Excel Solver as well as learning about the evolving supply chain innovations.

LSCM 721 Advanced Topics in Supply Chain Management**3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

This course extends the knowledge acquired in basic courses in order to learn advances tools to model and solve quantitative problems arising in supply chain management. The course will focus not only the deterministic context but will cover even the stochastic settings in which the input data are not known with certainty in advance but can be represented through a probability distribution. Specialized software packages will be also used in order to solve real-life logistics applications in reasonable amount of time.

LSCM 731 Industry 4.0 in Manufacturing and Supply Chain**3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

The course introduces the fundamentals related with the Industry 4.0 in manufacturing and its interface with the qualogistics chain considering both logistics and qualities aspects of the supply chain. The course provides necessary knowledge and understanding of the evolution of the industrial activities and supply chain management toward the so called smart production and high-performance qualogistics that arise from the technologies in this new industrial era.

LSCM 741 Machine Learning for Supply Chain Management**3 Credits**

Grade Mode: Standard Letter, Audit/Non Audit

This course caters to PhD and Master's students, offering a deep dive into the synergy between machine learning and supply chain management. Focused on practical applications, it provides expertise in utilizing Python and PyTorch for optimizing supply chain operations. Covering aspects from demand forecasting to transportation optimization, participants tackle real-world challenges through lectures, case studies, and projects. Graduates gain a robust understanding of machine learning's strategic application in modern supply chains, enabling data-driven decision-making for careers in academia or industry

LSCM 890 Dissertation Hours**1-9 Credits**

Grade Mode: Pass/Non Pass

Fulfilling curriculum research requirements.