

ENGINEERING MANAGEMENT AND DECISION SCIENCES

Programs

- Logistics and Supply Chain Management, Master of Science (<https://catalog.hbku.edu.qa/academic-degrees/cse/emds/logistics-supply-chain-management-ms/>)
- Logistics and Supply Chain Management, PhD (<https://catalog.hbku.edu.qa/academic-degrees/cse/emds/logistics-supply-chain-management-phd/>)
- Mechanical Engineering, Bachelor of Science (<https://catalog.hbku.edu.qa/academic-degrees/cse/emds/mech-bs/>)
- Sport and Entertainment Management, Master of Science (<https://catalog.hbku.edu.qa/academic-degrees/cse/emds/msem/>)

Division Courses

Hospitality, Retail & Sport Management

HRSM 650 Field Project in Hospitality, Retail and Sport Management

3 Credits

Grade Mode: Standard Letter, Audit/Non Audit

This course even though intended to provide a student with practical work experience, the field project is also an academic course with corresponding assignments and projects. These assignments and projects should stimulate the student to maximize his or her experience and integrate classroom learning with real world application.

HRSM 700 Quantitative Methods in Hospitality, Retail, and Sport Management

3 Credits

Grade Mode: Standard Letter, Audit/Non Audit

This course aims to equip students with knowledge and understanding of quantitative methods used in the fields of hospitality, tourism, and sport management. The course covers basic statistical concepts, principles, and methods required for scientific investigation of research problems in HRSM. The primary topics will include descriptive statistics, confidence interval, hypothesis testing, bivariate correlation, simple linear regression and multiple linear regression analyses. Students will learn how to analyze research data and utilize statistical output for reporting research findings.

HRSM 788 Business Analytics in Hospitality, Retail and Sport Management

3 Credits

Grade Mode: Standard Letter, Audit/Non Audit

This course introduces students to the methods and application of business research in the areas of hospitality, retail, and sport management. Areas covered include the study of the research process, research designs, sampling procedures, measurement techniques, survey research, hypothesis testing, and the research report. After successful completion of the course, students will be able to use research methods to solve problems for firms in their respective industries.

Logistics & Supply Chain Management

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-scale, 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 643 Data Analytics for Supply Chain Optimization **3 Credits**
Grade Mode: Standard Letter

This course introduces probability, statistics, and programming for data analysis, focusing on operations and supply chain management. Students learn key statistical concepts, including probability distributions, hypothesis testing, regression, and inference. It covers machine learning techniques like classification, clustering, and predictive Modelling for data-driven decisions. Hands-on experience in Python enables data manipulation, visualization, and statistical modeling. By applying these skills, students analyze and interpret real-world supply chain and operational data effectively.

LSCM 644 Transportation Analytics **3 Credits**
Grade Mode: Standard Letter

This course covers Modelling and implementing key transportation and routing problems in logistics and supply chains. Topics include the Traveling Salesman Problem, Vehicle Routing, Inventory Routing, and Network Design, with applications in maritime, rail, and urban logistics. Students will explore optimization techniques, algorithm development, and case studies to solve complex transportation challenges. By the end, they will gain hands-on experience in advanced methodologies, preparing them for research or industry roles in transportation and supply chain optimization.

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
Grade Mode: Pass/Non Pass

1-6 Credits

Fulfilling curriculum research requirements.

LSCM 701 Research Seminar
Grade Mode: Pass/Non Pass

0 Credits

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
Grade Mode: Standard Letter

3 Credits

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

LSCM 711 Supply Chain Modeling and Optimization
Grade Mode: Standard Letter, Audit/Non Audit

3 Credits

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
Grade Mode: Standard Letter, Audit/Non Audit

3 Credits

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
Grade Mode: Standard Letter, Audit/Non Audit

3 Credits

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
Grade Mode: Standard Letter, Audit/Non Audit

3 Credits

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 742 Cutting-Edge Techniques in Prescriptive Analytics

3 Credits

Grade Mode: Standard Letter

This course covers advanced optimization theory and practice, focusing on integer and combinatorial optimization, relaxation techniques, polyhedral approaches, and cutting-plane algorithms. Topics include dynamic programming, reformulation, and decomposition methods such as Lagrangian relaxation, Dantzig-Wolfe, column generation, and Benders decomposition. Emphasis is placed on real-world logistics and supply chain applications. Designed for PhD students, the course equips them with practical and theoretical tools to tackle complex optimization challenges in research and industry settings.

LSCM 743 Stochastic Modelling and Optimization

3 Credits

Grade Mode: Standard Letter, Audit/Non Audit

This graduate course introduces decision-making under uncertainty, focusing on stochastic optimization in logistics and supply chain management. It covers Modelling uncertainty, key decision parameters, and optimization challenges. Students explore real-world applications in logistics, transportation, health, energy, and finance while learning stochastic programming theory, modeling, and solution methods. Emphasizing interdisciplinary approaches, the course is ideal for those with backgrounds in linear programming, probability, and mathematical modeling. Students engage in research, literature review, problem identification, and stochastic system modeling.

LSCM 890 Dissertation Hours

1-9 Credits

Grade Mode: Pass/Non Pass

Fulfilling curriculum research requirements.

Sports and Entertainment

SPTE 590 Special Topics in Sport and Entertainment

3 Credits

Grade Mode: Standard Letter, Audit/Non Audit

This course investigates special topics pertinent to the sport and entertainment management industry, and specifically examines in detail the concept of mega-event sport tourism. It examines mega-event sport tourism from both the sport and entertainment and hospitality and tourism sectors; including management of the Olympic Games, theories that may explain willingness to support the Olympic Games as a sport tourism mega-event and impacts of sport tourism mega-events in a geopolitical arena.

SPT 612 Sport Governance 3 Credits
Grade Mode: Standard Letter, Audit/Non Audit

This course is designed to examine how sport organizations operate, emphasizing, however, on how sport organizations are expected to operate. This more normative approach is facilitated by references to principles of good governance, i.e., transparency, accountability, democracy and social responsibility. The student will learn about the main theoretical approaches underpinning governance, as well as the main governance challenges facing the sport sector, including the impact poor governance and lack of accountability can have on different types of sport organizations.

SPT 640 Venue Management: Principles and Practices 3 Credits
Grade Mode: Standard Letter, Audit/Non Audit

The course examines the principles and practices associated with managing a public assembly venue (PAV) and the nature of the PAV business. The emphasis will be on assisting the student in understanding the concepts and related to this relatively new professional field. The course examines the types of issues that venue managers must consider, together with gaining some practice in applying concepts and principles to those issues.

SPT 670 Special Topics in Global Sport 3 Credits
Grade Mode: Standard Letter, Audit/Non Audit

This course investigates special topics pertinent to the sport and entertainment management industry, and specifically examines the critical role a of broadcasting in the economy of the sport and entertainment industry. The course explores the various models for broadcasting rights, the political economy of sport broadcasting, and its contemporary developments. The course addresses the complex interactions between competition at local, regional and transnational levels.

SPT 701 Management in the Sport and Entertainment Industry 3 Credits
Grade Mode: Standard Letter, Audit/Non Audit

This course examines the concepts and principles of management and the role of management in the sport and entertainment industry. The course examines different management theories, management functions and leadership styles, while applying concepts and principles to current management issues in the sport and entertainment industry.

SPT 736 Sport Event Entrepreneurship 3 Credits
Grade Mode: Standard Letter, Audit/Non Audit

This course investigates the entrepreneurial process and relates this process to the creation of a sport/entertainment event. Students will identify, describe and utilize identifiable techniques to generate ideas, conduct feasibility analyses, identify and utilize the 4 Ps of marketing to outline and develop a business plan for a chosen sport/entertainment event.

SPT 760 Principles of Sport and Entertainment Marketing 3 Credits
Grade Mode: Standard Letter

This course examines the theoretical and practical aspects of sport and entertainment marketing including its dynamic nature and the importance of branding. It aims to provide an understanding of the importance of marketing and consumer behavior theory and fundamentals specific to the marketing of sport and entertainment. The course introduces students to marketing within the sport and entertainment industry, including the unique aspects of sport and entertainment as product, the sport and entertainment consumer market and the sport product market.

SPT 777 Sport and Events Logistics 3 Credits
Grade Mode: Standard Letter, Audit/Non Audit

This course brings together the strategic, planning, and operational roles of logistics when applied to sport and entertainment management. The aim is the gain knowledge on how to apply logistics models and methods for the optimal management of personnel, facilities and flows involved in sport and entertainment events.

SPT 781 Seminar on the Olympic Games 3 Credits
Grade Mode: Standard Letter, Audit/Non Audit

This course investigates special topics pertinent to the sport and entertainment management industry, and specifically examines in detail the concept of mega-event sport tourism. It examines mega-event sport tourism from both the sport and entertainment and hospitality and tourism sectors; including management of the Olympic Games, theories that may explain willingness to support the Olympic Games as a sport tourism mega-event and impacts of sport tourism mega-events in a geopolitical arena.

SPT 790 Sport and Entertainment Finance 3 Credits
Grade Mode: Standard Letter, Audit/Non Audit

The course examines the concepts and principles of financial management, and its application within the sport and entertainment context. The course provides an understanding of the financial information necessary to perform the usual duties and responsibilities associated with sport facilities, programs and organizations.

SPT 798 Directed Study in Sport and Entertainment Management 3 Credits
Grade Mode: Standard Letter, Audit/Non Audit

This course is a course that focuses on a special project/ study and/or research undertaken Directedly by the student. Students are expected to embark on a project and/or study focusing on a particular aspect of sport and entertainment management, and is related to his or her special interest. Students are expected to undertake a set of activities, as agreed upon, based on the topic under study.

SPT 799 Thesis Preparation 1-6 Credits
Grade Mode: Pass/Non Pass