MS in Supply Chain Management  
Course Curriculum (32 credits)

**Leadership Development (2cr)**: Carefully designed lectures, exercises and assignments are positioned through the year to assess and develop leadership skills personalized to each student at three levels: (i) how to lead self: leveraging current strengths, (ii) how to lead others: teamwork, collaboration, motivation, and feedback, and (iii) how to lead organizations: operating in complex global work environments. Substantively, the course is committed to creating an intellectual context that is now viewed as central to developing supply chain leaders. Specifically, the course provides opportunities for raising environmental, social and political awareness; learning about social media and related communications technologies and channels; and interacting with non-commercial organizations such as government and NGOs.

**Managing Supply Chain Operations – A Cohort Experience (4cr)**: This course serves as an introduction to the program, providing an overview of the fundamental concepts of supply chain and operations management. The course is taught as a cohort experience with opportunities to interact outside the classroom. Supply chain professionals from a variety of industries are featured throughout to highlight how the concepts apply in different contexts. Students learn methods and models for evaluating and improving end-to-end processes and gain an understanding of the operational challenges inherent in managing global supply chains. The course takes a strategic and cross-functional view of supply chains in both product and service based industries.

**Big Data Analytics in Supply Chains (2cr)**: With the advancement of digital technologies and networking capabilities, firms are actively engaged in capturing “big” data related to their supply chains. Firms recognize the immense potential in mining big data for improving the quality and timeliness of decisions, and becoming proactive in sensing and responding to external and internal signals of threats and opportunities. The course develops the capability to analyze and interpret data that is fundamental to managing supply chains. It provides an overall understanding of the data and information management framework. This includes an overview of enterprise resource planning, value chain management and customer relationship management frameworks, the interconnections and interdependencies of functions from an information and data perspective. Through a combination of case studies and hands-on exercises, students learn (i) the various facets of data analytics: data access, data aggregation, data analysis and data visualization; (ii) appropriateness and inappropriateness of big data analysis; and (iii) big data based predictive analytics.
Statistics (2cr): This course introduces quantitative and business statistics concepts for managerial decision making and problem solving. The course first focuses on the nature of statistical studies and the differences between observational and experimental studies. Methods for producing data, including sampling techniques, process monitoring, and designed experiments will be discussed. Students learn graphical and numerical methods for descriptive statistics. Foundations for statistical inference are covered, including basic probability, discrete and continuous probability distributions, and sampling distributions of statistics. Students then learn how to apply the two basic inferential methods of statistics, statistical estimation and tests of statistical hypotheses. These methods are used to make inferences about population parameters including means, proportions and standard deviations. The students also learn to identify sample size requirements.

Operations Excellence via Lean Thinking (2cr): This course introduces the concepts and theory of quality control, philosophical foundations of lean thinking, and technical concepts related to flow and pull, and tools such as value stream mapping, A3, and 5S. Students learn to identify, measure and eliminate non-value added activities, process capability analysis, statistical process control, and acceptance sampling from extended value chains in manufacturing and service settings through hands-on exercises.

Sales, Inventory and Operations Planning (2cr): Every plan needs a forecast – a reasonable prediction of the future. The demand forecast is among the most important of such predictions in a business context. In the short run, these predictions influence inventory and production decisions, the timing of promotions as well as financial and human resource planning. In the long run, this forecast shapes decisions to build (or close down) plants, add (or remove) products from a portfolio, and investor confidence in the stock price. The academic literature on forecasting is vast, and spans disciplines such as statistics, economics, operations management and decision making. Forecasting software is readily available to support decision making, but without a proper understanding of the basics of forecasting, such software appears as a black-box, and the output from this software receives little trust within an organization. What should an executive know about forecasting? How can we design an organization to make better use of available information, and coordinate activities across functions? Students will learn forecasting methods, inventory models including lot-sizing models, reorder-point concept, Wagner-Whitin model, etc., and aggregate planning methods.

Logistics and Transportation (2cr): As supply chains become increasingly global, managing the complexity of distribution and transportation is critical to supply chain performance. This course focuses on the role of logistics and distribution networks in customer order fulfillment. Particular emphasis is placed on the linkage among logistics, warehousing and information systems, and the trade-offs involved in alternative distribution strategies. The course also explores the role of third-party logistics providers. Students learn models and techniques related to designing distribution networks that align with the firm’s supply chain and corporate strategy.
**Strategic Sourcing (2cr):** Procurement and supply management has become increasingly visible in a world where supply is a major determinant of organizational success. Supply chain performance influences not only operational and financial risks but also reputational risk. Although this course explores cost containment and supply process improvement methods, it also pushes into revenue enhancement. The job of the supply manager today goes way beyond the scope of value and efficiency to the search for competitive advantage through the supply network. In addition to organizing the supply function for strategic advantage, the course explores strategic sourcing, supplier selection and evaluation techniques, supplier development methods, global sourcing techniques, as well as legal and ethical challenges. High-performance supply managers live for the challenges associated with building and maintaining a high-performance supply chain.

**Managing Technology in Supply Chains (2cr):** This course prepares students to make well-informed technology choice decisions and effectively manage the development and implementation of technologies. The central question around which the course is organized is: How should technology and the related process and people issues be managed to enhance the competitiveness of individual (manufacturing and/or service) firms and their supply chain trading partners (i.e., suppliers and customers)? The course adopts an end-to-end view of specific supply chains of firms and industry sectors to address specific topics such as: how to identify the appropriate application context of technologies in the supply chain; and how to realize the strategic potential of technologies that enable supply chain integration.

**Supply Chain Finance (2cr):** Managing the financial flows and capital is just as important as managing the physical flow of goods and services. This course focuses on the underlying link between supply chain performance and the financial systems within an organization. Students learn concepts and tools related to supply chain costing, valuation, and projecting cash flow and capital requirements. The course looks at issues including tax and trade credits, and students develop an understanding of how financial considerations influence and inform a firm’s supply chain strategy.

**Responsible Supply Chain Management (2cr):** Companies around the world are facing increasing pressure to perform well on the triple bottom line – People, Planet, and Profit – and responsible supply chain management is often a cornerstone of the CSR strategy for many companies. This course looks at how and why responsible supply chain management could be a powerful strategy to enhance a company’s triple bottom line. The course focuses on the social and environmental aspects of managing supply chain operations. Particular emphasis is placed on human rights, health and safety, and environmental issues faced by supply chain managers and the linkage to the firm’s supply chain strategy.
Global Operations Strategy – An Experiential Course (4cr): This course will examine, compare and contrast business models that work globally, and require a careful design of processes and supply chains to deliver the capabilities necessary to create a competitive advantage. This course helps students understand the strategic nature of decision making in operations, and allows them to apply such thinking to the design and improvement of global supply chain networks that span both developed and developing economies. The course contains an essential experiential component. Students will work with companies, either locally in Minnesota or across the world, on real world supply chain applications.

ELECTIVES

Supply Chain Management in the Health Care & Medical Devices Sector (2cr): This course identifies the inter-relationships between the partners in a health care supply chain that links the development of care to the delivery of care. Issues addressed in the course include managing health care supply chain with: increasing complexity of manufacturing pharmaceuticals and medical devices; increasing variety in drugs, devices and equipment to meet rapidly changing markets; increasing demand for affordable products from emerging economies; growing quality and compliance challenges with drugs and devices becoming more complex and regulatory scrutiny becoming stricter; and increasing frequency of recalls. Some examples of specific problems in health care delivery are: capacity planning and management in hospitals, location of health care facilities, supply chain management of blood banks, ambulance service planning, etc.

Supply Chain Management in the Food & Agribusiness Sector (2cr): The food and agribusiness supply chain is complex. It spans input companies, farmers, traders, food companies and retailers. The goal of this supply chain is to provide access to affordable food, feed, fiber and fuel in a sustainable manner. The course covers topics relevant to achieving this goal such as supply management, production management, and demand management to consumers. Issues such as diversity of production and demand, bulkiness of produce, perishability, seasonality and complexity of supply chains of food and agricultural products will be addressed.

Supply Chain Management in the Retail Sector (2cr): This course reviews how the retail sector has evolved over the years and the significance of supply chain management in the retail sector. The course examines the various functional components of retail supply chain management, and focuses on analysis and metrics required to effectively manage a retail supply chain. The students learn the “language” of retailing and acquire the fundamental skills needed to effectively analyze the performance of retail supply chains. Cases are discussed to illustrate how customers are becoming more exacting and demanding ever-increasing levels of service; and how retailers are responding by increasing product variety, becoming more price competitive, striving towards higher service levels, and
utilizing advances in computing capabilities, information technologies, and retail analytics to improve their supply chain efficiency.

**Project Management (2cr):** In the course of their careers, contemporary managers spend a significant amount of time either participating in or leading projects. Projects are frequently used as proving-grounds for high-potentials. The skills that are required in project management are often the very same attributes that are required for successfully managing a business. While every project is by definition unique, some concepts and tools (e.g., critical path method, time and cost tradeoffs, resource utilization, methods to deal with uncertainties) in project management apply to a wide range of different types of projects. The aim of this course is to equip students with these concepts and tools (e.g. Monte Carlo simulation, risk analysis, etc.) and to develop them into successful project managers, as well as team members.

**Supply Chain Quality and Security (2cr):** This course covers the strategic, behavioral, and technical aspects of managing supplier quality and security. As supply chains become more global, firms need to assure the quality and security of goods from their suppliers. At a minimum this involves understanding international standards like ISO 9000 (quality) and ISO 28000 (security). Supply chain leaders also need to manage product recalls and failures. Failure to predict and respond to such supply chain disruptions damages the value of the firm. This course examines how to assure quality and security across the supply chain. It covers tools and methods used to analyze, improve, and control supply chain processes. The course also investigates how to design the structure and infrastructure of the supply chain to better predict and respond to product failures and recalls. It draws on various management theories like normalized deviation, high reliability organizations, and normal accidents theory to understand how to better manage supply chain quality and security. The course draws on examples from a variety of industries and government.

**Negotiations in Supply Chains (2cr):** Negotiation is the art and science of securing agreements between two or more interdependent parties. Managing supply chains often requires extensive negotiations related to pricing, joint problem solving and collaboration. This course (i) helps students understand the theory and processes of negotiation as it is practiced in supply chains, (ii) highlight the components of an effective negotiation, and (iii) help students analyze their own behavior in negotiations. The course is largely experiential, providing an opportunity to develop skills by participating in supply chain negotiation exercises and integrating experiences with the principles presented in the assigned readings and class discussions.

**Service Operations (2cr):** This course has students examine management challenges surrounding delivery of both pure services (such as health care) as well as services bundled into product-based supply chains. Students develop the ability to (i) define a market-valued service package, (ii) design the service delivery system
and its component processes, (iii) manage demand and capacity for services, and (iv) understand behavioral issues to guide the design and management of service encounters between providers and customers. Services tend to be less tangible than products, but they still require well-designed processes and systems. The course uses a cross-disciplinary perspective to help students integrate business function foundations into well-designed systems for delivery of services.