Supply Chain and Analytics

The Supply Chain & Analytics Department is responsible for a broad range of topics in the areas of supply chain management and business analytics. The department faculty are recognized as supply chain and analytics thought leaders who are most connected to the region’s businesses.

**Supply Chain Management (SCM)** is the cornerstone of modern economies and includes all of the activities needed to get the right product to the right place in the right quantity at the right time. This requires effective procurement and sourcing, transportation and logistics, manufacturing and service delivery, inventory and warehousing, distribution, sales and customer service, as well as the associated information and financial management. SCM professionals are involved in every facet of an organization as they work to create a sustainable competitive advantage. Business Analytics includes a wide range of techniques, skills, statistical methods, and modeling to develop better understanding and new insights for data-driven decision making. Departmental programs cover descriptive, predictive and prescriptive analytics, including optimization and simulation, as well as effective communication of results from analytics projects. Graduates in Supply Chain & Analytics are in high demand in all types of service, manufacturing and government organizations.

Supply Chain & Analytics faculty and students are involved in a wide range of theoretical and applied research activities in collaboration with academic colleagues and industry partners, especially through the College’s Center for Transportation Studies and the Center for Business and Industrial Studies. The department is supported by a very active and engaged departmental Advisory Board of leading companies and organizations in the St. Louis region.

**Degrees**

Business Administration BS, Supply Chain Management Emphasis (http://bulletin.umsl.edu/programs/business-administration-bs-supply-chain-management-emphasis)

Business Administration MBA, Logistics and Supply Chain Management Emphasis (http://bulletin.umsl.edu/programs/business-administration-mba-logistics-and-supply-chain-management-emphasis)

Business Administration MBA, Operations Management Emphasis (http://bulletin.umsl.edu/programs/business-administration-mba-operations-management-emphasis)

Business PhD, Logistics and Supply Chain Management Emphasis (http://bulletin.umsl.edu/programs/business-phd-logistics-and-supply-chain-management-emphasis)

**Minors**

Supply Chain Management Minor (http://bulletin.umsl.edu/programs/business-administration-bs-supply-chain-management-emphasis)

Transportation Studies Minor (http://bulletin.umsl.edu/programs/business-administration-mba-operations-management-emphasis)

**Certificates**

Business Intelligence Graduate Certificate (http://bulletin.umsl.edu/programs/business-intelligence-graduate-certificate)

Logistics and Supply Chain Management Graduate Certificate (http://bulletin.umsl.edu/programs/logistics-and-supply-chain-management-graduate-certificate)

**Courses**

**SCMA 3300 Business Analytics and Statistics: 3 semester hours**
Prerequisites: MATH 1105, INFSYS 1800 and a 2.0 campus GPA. This course covers basic statistical analysis (descriptive and predictive analytics) for business management. Tools include matched sample tests, chi-square tests, rank sum tests, simple linear regression and correlation, multiple linear regression, and extrapolative techniques such as moving averages and exponential smoothing. Emphasis is placed on problem definition, construction of statistical models, analysis of data, and interpretation of results.

**SCMA 3301 Introduction to Supply Chain Management: 3 semester hours**
Prerequisites: A minimum campus GPA of 2.0. This course provides an understanding of fundamental concepts of supply chain management. All functional areas of supply chain management are explored in an integrated view of procurement, manufacturing and operations management, transportation and logistics, inventory and warehousing, demand planning, scheduling, network design, collaboration and performance measurement. Topics also cover supply chain financial metrics, strategy and change management for demand driven value networks.

**SCMA 3320 Advanced Supply Chain and Operations Management: 3 semester hours**
Prerequisites: SCMA 3301 or MATH 1320 and a 2.0 campus GPA. This course covers supply chain management with special focus on understanding manufacturing and service operations. Emphasis is on the application of quantitative methods to the solution of strategic, tactical and operational problems. Topics include demand planning, capacity, new product design and launch, process selection, facility layout, production planning, scheduling, inventory, process control, waiting lines, lean production, etc.

**SCMA 3321 Procurement: 3 semester hours**
Prerequisites: SCMA 3301 and a 2.0 campus GPA. This course covers procurement processes and supplier management, with emphasis on managing a supplier base for both products and services. Topics include the strategic role of procurement in supply chains, sourcing options, identification and evaluation of requirements, the role of product design, make-versus-buy decisions, and supplier selection and evaluation.

**SCMA 3345 Predictive Analytics and Data Mining: 3 semester hours**
Prerequisites: SCMA 3300 and a minimum campus GPA of 2.0. This course focuses on predictive analytics in business settings. Topics may include applications of multivariate analyses to problems in marketing, finance, transportation and logistics. The course covers use of decision trees, regression and logistic regression to explain phenomena and predict future outcomes. Students acquire experience in the use of modern tools for data mining.
SCMA 3370 Introduction to Transportation: 3 semester hours
Same as MKTG 3770. Prerequisites: A minimum campus GPA of 2.0. This course provides an overview of the transportation sector, including history, providers, users, government regulation, and the central role of transportation in supply chain management. The course covers the importance of domestic and global transportation, the operational aspects of the various transportation modes (rail, water, motor, air, and pipeline), the role of transportation intermediaries, the demand and supply of transportation, and the managerial aspects of transport in both the commercial and urban environment.

SCMA 3371 Traffic and Transportation Management: 3 semester hours
Same as MKTG 3771. Prerequisites: SCMA 3370 or MKTG 3770, and a minimum campus GPA of 2.0. This course focuses on transportation management as a function of a firm’s logistics and supply chain strategy. The course covers the management of the various transportation modes (rail, motor, air, water, and pipeline), strategic use of transportation intermediaries such as 3PL's, and linkages between transportation and warehousing. This course is designed to provide a basic understanding of the issues and work performed by transportation managers, including costing and pricing, transportation procurement, transportation technology, and cross border trade management.

SCMA 3376 Transportation Security and Risk: 3 semester hours
Same as MKTG 3776. Prerequisites: SCMA 3370 or MKTG 3770 and a minimum campus GPA of 2.0. This course emphasizes risk and security issues related to transportation systems and supply chains, including highway, aviation, pipeline, waterway, transit, and rail networks, as well as port facilities. The course also provides an overview of transportation safety issues including passenger and employee safety, and hazardous materials. It addresses transportation and supply chain risk management and continuity strategies to prepare for, and respond to, disruptions as from terrorism events or natural disasters.

SCMA 3390 Internship in Supply Chain and Analytics: 1-3 semester hours
Prerequisites: Minimum business GPA of 2.5, minimum campus GPA of 2.0, completed and/or currently enrolled in at least 6 credit hours of departmental electives, consent of supervising instructor, and consent of department chair. Students are employed in the field where they apply the knowledge and skills learned in the classroom. Professional development and obtaining specialized work experience are the primary goals. A departmental faculty member will monitor the student's program with the student providing a formal written report at the end of the project. Students cannot receive credit towards the emphasis for both SCMA 3390 and SCMA 4389. Repeatable for a maximum of 9 credit hours.

SCMA 3398 Seminar in Supply Chain Management and Analytics: 1-3 semester hours
Prerequisites: To be determined each time the course is offered and to include a minimum 2.0 campus GPA. This course is a selected special topic in the fields of supply chain management and analytics. May be repeated for credit with different topics.

SCMA 3399 Independent Study in Supply Chain and Analytics: 1-3 semester hours
Prerequisites: Minimum campus GPA of 2.0 and approval by the supervising professor and the department chair. Special individual study in supply chain and analytics under the supervision of a full-time faculty member of the department.

SCMA 3312 Business Forecasting: 3 semester hours
Prerequisites: Minimum campus GPA of 2.0 or graduate standing SCMA 3320 or (MATH 3000 and MATH 1320), minimum campus GPA of 2.0 or graduate standing. Further study of statistical tools for forecasting in a decision-making context. Topics include explanatory models (multiple regression), classical time series decomposition, and extrapolative techniques (exponential smoothing and Box-Jenkins procedures). In addition, methods for considering problems of intervention effects, seasonality, and collinearity will be discussed. Students will perform extensive analyses of time series data using computer packages.

SCMA 4325 Environmental Sustainability in Business Operations: 3 semester hours
Same as BUS AD 4325. Prerequisites: SCMA 3301 or permission of instructor. This course studies the environmental impacts of business operations, and it focuses especially on the principles and methods of "lean and green" operations, i.e., ways in which organizations can reduce their costs and increase profits, while reducing their environmental impacts. Specific topics include energy efficiency, resource reduction, waste reduction, design for the environment, externalities and internal pricing mechanisms, environmental technologies, life-cycle assessment, recycling, re-use, and re-manufacturing, as well as national and global environmental issues.

SCMA 4330 Business Logistics: 3 semester hours
Prerequisites: SCMA 3320 and a minimum campus GPA of 2.0. This course addresses the analysis of business logistics systems, their design, and operation in light of cost and service tradeoffs. Topics include performance measures and management, logistics and supply chain network design, facility location, transportation, vehicle routing, storage and handling, capacity planning, inventory management, customer service and the role of technology.

SCMA 4331 Applied Supply Chain Modeling: 3 semester hours
Prerequisites: SCMA 3320 and a 2.0 minimum campus GPA. This course introduces applied models and technology for supply chain management through hands-on experience using state-of-the-art software and tools for the design and operation of supply chains. The course covers the economic tradeoffs involved in such decisions, data requirements, operating parameters, application of software packages and performance management and analytics.

SCMA 4347 Introduction to Project Management: 3 semester hours
Prerequisites: SCMA 3301 and a minimum campus GPA of 2.0. This course introduces the concepts and practices of Project Management with a focus on supply chain and analytics related projects. It covers conventional aspects of project management, such as the project evaluation, planning, roles, responsibilities, scheduling, and tracking. In addition, this class introduces agile project management as applicable to projects where there is not the specificity of goals or solutions to be applicable to traditional project management.
SCMA 4350 Prescriptive Analytics and Optimization: 3 semester hours
Prerequisites: MATH 1105 and a minimum campus GPA of 2.0. This course covers the construction and application of prescriptive analytical models for optimizing business decisions in a wide range of areas such as manufacturing, service, supply chains, logistics and finance. Topics include performance metrics, linear programming, integer programming, network optimization, simulation, and implementation using Excel.

SCMA 4381 Global Supply Chain Management: 3 semester hours
Same as INTL BUS 4381. Prerequisites: SCMA 3301 and a minimum campus GPA of 2.0. This course covers business logistics and supply chain strategies involving shipments across national boundaries. Topics may include the effects of international agreements and regional trading blocks on supply chain strategies, the design of global logistics networks, managerial processes and systems for international production and distribution, and risk management for international logistics.

SCMA 4389 Supply Chain Management Practicum: 3 semester hours
Prerequisites: SCMA 3320. This course engages students with local organizations to provide practical experience in critical thinking, analysis, and communication in a supply chain context. This allows students to integrate, synthesize and apply supply chain management knowledge and skills in a real business/organization through projects jointly supervised by a faculty member and a supervisor from the organization. Students cannot receive credit towards the emphasis for both SCMA 3390 and SCMA 4389.

SCMA 4398 Advanced Topics in Supply Chain and Analytics: 1-3 semester hours
Prerequisites: SCMA 3301 or permission of the instructor and a minimum 2.0 campus GPA. An intensive study of a specific aspect, problem or technique in the areas of supply chain management, analytics, logistics, or operations management. Different topics may be offered under this course number, so the course (with different topics) can be repeated for credit.

SCMA 5300 Statistical Analysis for Management Decisions: 3 semester hours
Prerequisites: MATH 1030 and spreadsheet modeling or equivalent competency. Probability and probability distributions are studied as a basis of statistical inference. An introduction to multivariate analysis is provided, which includes analysis of variance and regression methods.

SCMA 5320 Production and Operations Management: 3 semester hours
Prerequisites: SCMA 5300. This course discusses issues related to the creation and delivery of goods and services. Topics include the design of production processes, the layout and location of facilities, forecasting, scheduling, inventory control, queuing, materials planning, and quality control. Analytical techniques such as linear programming are used in studying these problems.

SCMA 5322 Lean Production: 3 semester hours
Prerequisites: SCMA 5320. Study of Lean Production philosophy and techniques in manufacturing and service operations. Topics include process analysis and continuous improvement, set-up reduction, total productive maintenance, kanban scheduling, cellular production, work teams, supplier relations, quality management, and the environmental aspects of production. Cases and a course project will be used to integrate and apply the course material.

SCMA 5325 Environmental Analysis and Sustainability in Business Operations: 3 semester hours
Same as BUS AD 5325. Prerequisites: SCMA 5320 or consent of instructor. This course studies the environmental impacts of business operations, and it focuses especially on the principles and methods of "lean and green" operations, i.e., ways in which organizations can reduce their costs and increase profits, while reducing their environmental impacts. Specific topics include energy efficiency, resource reduction, waste reduction, design for the environment, externalities and internal pricing mechanisms, environmental technologies, life-cycle assessment, recycling, re-use, and re-manufacturing, as well as national and global environmental issues.

SCMA 5334 Internship in Logistics and Supply Chain Management: 1 semester hour
Prerequisite: Consent of instructor. Students receive practical experience in the area of logistics or supply chain management. The internship is supervised by a professional in the host organization in consultation with a faculty member.

SCMA 5340 Transportation Economics for Business Managers: 3 semester hours
Prerequisites: ECON 3001 or BUS AD 5000 or consent of instructor. This course makes use of a range of economic concepts to examine the nature of markets in which transport services are provided. This course is designed for future transportation professionals who wish to explore the fundamentals of economics in their field. Basic concepts covered include the theory of transportation demand, transportation costs and investment planning, and current topics in transportation economics such as regulation-deregulation and social cost pricing.

SCMA 5349 Project Consulting and Execution: 3 semester hours
Prerequisites: SCMA 5300 or equivalent; SCMA 5320 or equivalent (may be taken concurrently). Provides real world experience in planning and executing projects. The class will have teams of students work on projects sponsored by companies and not for profit organizations for 2 to 6 weeks at a time. It will provide students practice in critical thinking, analysis, communication, and other critical skills identified as necessary for employees to function at a high level in their jobs. A student may NOT count SCMA 5349 and an internship toward the SCMA emphasis. Only one of the two would count.

SCMA 5354 Simulation for Managerial Decision Making: 3 semester hours
Prerequisites: SCMA 5320. Introduction to simulation as a managerial decision-making aid. Application of simulation to a number of management science-oriented problems. This course introduces and requires use of a simulation language.

SCMA 5381 International Logistics and Operations Management: 3 semester hours
Same as INTL BUS 5381. Prerequisites: SCMA 5320. A study of international logistics and operations management strategy, planning and operations. Topics may include multinational logistics and supply chain strategies, global network design and sourcing, international transportation, distribution and operations, import-export, risk management, etc.

SCMA 5399 Individual Research in Logistics and Operations Management: 1-3 semester hours
Prerequisites: Consent of instructor and graduate director. Special individual research topics in Logistics and Operations Management under the guidance of a specific professor.
SCMA 6330 Business Logistics Systems: 3 semester hours
Prerequisites: SCMA 5320 (may be taken concurrently). Analysis of business logistics systems and their role in supply chain management. Covers both design and operation of logistics systems and their components. Topics may include network design, facility location, transportation, vehicle routing, inventory management, customer service, reverse logistics and logistics information systems.

SCMA 6331 Logistics and Supply Chain Operational Modeling: 3 semester hours
Prerequisites: SCMA 5320 and SCMA 6330. A study of the application of leading software packages to modeling problems and issues arising in the operational management of logistics and supply chains. This course covers the economic tradeoffs involved in such decisions, data requirements, operating parameters, and application of software packages to problems such as vehicle routing and scheduling, freight shipments consolidation, cross-docking, and other operational and tactical strategies. This "hands on" course is designed to prepare students for higher-level supply chain analyses and consulting work.

SCMA 6332 Logistics and Supply Chain Strategic Modeling: 3 semester hours
Prerequisites: SCMA 5320 and SCMA 6330. A study of the application of leading software packages to modeling problems and issues arising in the planning and strategic management of logistics networks and supply chains. The course identifies and explores the economic and customer service tradeoffs involved in such networks. Issues such as location of facilities assignment of production and distribution missions to facilities, identification of sourcing relationships amongst facilities, and identification of cost and customer service consequences of alternative supply chain designs are addressed by the application of commercial software packages to support decision making. This "hands on" course is designed to prepare students for high-level supply chain analyses and consulting work.

SCMA 6338 Business Processes: Design, Management & Integration: 3 semester hours
Prerequisites: SCMA 5320. This course presents the concepts and state of the art of state of the practice of business process design and business process management for improving business performance, effectiveness, quality, customer service and satisfaction. Issues related to characteristics, goals, benefits and costs of enterprise-wide design, and the role of information technology during the design process will be discussed. Specific topics will include: the history and development of process focused businesses and the impacts on processes caused by just-in-time and total quality management philosophies, organizational learning, strategy mapping, et.al. We will also discuss the exploitation of core competencies and changing business scenarios such as globalization and electronic-commerce. We will draw from the literature to explore the notion of moving from business strategies to business processes. We will review current writings relative to the subject, and then will apply our knowledge to actual process design, documentation, analysis and simulation. We will introduce computer-based modeling tools for process design and simulation, and use those tools in both in-class and individual work.

SCMA 6345 Business Analytics and Data Mining: 3 semester hours
Prerequisites: SCMA 5300 and INFSYS 5800. This course concentrates on methods for converting data into business intelligence. It provides knowledge of the principles and techniques for business analytics and data mining. Topics include clustering, pattern recognition, visualization of relationships, predictive modeling, optimization techniques and simulation.

SCMA 6347 LOM Project Management: 3 semester hours
Prerequisites: SCMA 5320. This course addresses the concepts and processes of project management as applicable to Logistics and Operations Management. Students study organizational design, project specification, integrated project planning, risk management and project control; students will come to understand how globalization, environmental and sustainability issues, quality control (including industry standard initiatives such as the Continuing Integration Improvement Model and the International Standards Organization model), and cultural factors drive project management. NOTE: Credit may not be earned for both SCMA 6347 and INFSYS 6847.

SCMA 6350 Management Science Methods: 3 semester hours
Prerequisites: SCMA 5320. This course provides a working knowledge of management science techniques. It emphasizes analytical approaches to solving business problems, construction of mathematical models, and manipulation of model variables for managerial decision-making. Topics include mathematical programming, including integer and network models, heuristics, and simulation models.

SCMA 6355 Seminar in Logistics and Operations Management: 3 semester hours
Prerequisite: SCMA 5320. Topics of current interest in logistics and operations management. Topics may include just-in-time and lean production, quality management, manufacturing and service systems, transportation and logistics, quantitative management tools, etc.

SCMA 7381 International Supply Chain Management: 3 semester hours
Prerequisites: SCMA 5320. Admittance into the Ph.D. Program. A comprehensive examination of international logistics and supply chain management strategies, planning and operations from the firm's perspective. Topics may include multinational logistics and supply chain issues and management strategies, multinational sourcing and network design, transportation issues in international supply chains, multinational distribution and operations, legal and financial issues in import and export, risk identification and management in international supply chains, and the relationship of supply chain management to other activities of international firms.

SCMA 7390 Research Seminar in LSCM: 3 semester hours
Prerequisites: SCMA 6330. Admittance into the Ph.D. Program. Analysis of research approaches, and findings in Logistics and Supply Chain Management. May be repeated for credit when the subject matter is different.

SCMA 7393 Special Topics in LSCM: 3 semester hours
Prerequisites: Consent of instructor. Admittance into the Ph.D. Program. In-depth analysis of special topics in Logistics and Supply Chain Management research. May be repeated for credit when the subject matter is different.