

# SUPPLY CHAIN MANAGEMENT AND ANALYTICS (SCMA)

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## **SCMA 171. Mathematical Applications for Business. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: MATH 141 or satisfactory score on the VCU Mathematics Placement Test within the one-year period immediately preceding the beginning of the course. Pre- or corequisite: INFO 162. Mathematics equivalency may be validated by a satisfactory score on the VCU Mathematics Placement Test within the one-year period immediately preceding the beginning of the course. Formulation and solution of problems using a spreadsheet and algebra, mathematics of finance, matrices and introductory linear programming. Instruction will include spreadsheet use as a calculation and graphing tool.

## **SCMA 212. Differential Calculus and Optimization for Business. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: SCMA 171 or MATH 151 or satisfactory score on the VCU Mathematics Placement Test within the one-year period immediately preceding the beginning of the course. Univariate and bivariate differential calculus and optimization of algebraic functions that model business phenomena. Students should take SCMA 212 immediately after completing SCMA 171. Students may not receive degree credit for both SCMA 212 and MATH 200.

## **SCMA 301. Business Statistics I. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Prerequisite: BUSN 171\*, MATH 151, BUSN 212\*\*, MATH 200 or higher level mathematics course. Statistical methods for collection, visualization and analysis of business and economic data from populations and processes. Statistical thinking, concepts of variability, sampling, descriptive measures, contingency tables, probability and introduction to regression, correlation, confidence intervals and hypothesis testing, with implementation in spreadsheet software. Students may receive credit toward graduation for only one of STAT 206, STAT 208, STAT 210, STAT 212, STAT 312 or SCMA 301. This course was formerly numbered MGMT 301. \*Formerly MGMT 171, SCMA 171; \*\*formerly MGMT 212, SCMA 212.

## **SCMA 302. Business Statistics II. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Prerequisite: BUSN 212\* or MATH 200; and SCMA 301\*\*, STAT 210 or STAT 212. Statistical methods employed in the collection and analysis of business and economic data. Continuation of statistical inference for means and variable relationships using t-tests, analysis of variance, contingency tables, regression and correlation analysis with emphasis on problem formulation and interpretation of computational results. \*Formerly MGMT 212, SCMA 212; \*\*formerly MGMT 301.

## **SCMA 303. Business Analytics. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisites: BUSN 212\* or MATH 200; and SCMA 301\*\*, STAT 212 or STAT 210. Descriptive analysis (Excel models and pivot tables, summary statistics, data visualization and regression analysis), predictive analysis (time series and forecasting) and prescriptive analysis (optimization models, decision trees and sensitivity analysis). \*Formerly MGMT 212, SCMA 212; \*\*formerly MGMT 301.

## **SCMA 320. Production/Operations Management. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Prerequisite: SCMA 301, STAT 210 or STAT 212. This course is restricted to students who have completed at least 54 credit hours (junior standing). Discipline of management and the management process within the operations of an organization. Planning and controlling of operations through decision analysis, forecasting, aggregate planning, inventory management and quality management.

## **SCMA 339. Quantitative Solutions for Supply Chain Management. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: SCMA 301, STAT 210 or STAT 212. Enrollment is restricted to students who have completed at least 54 credit hours (junior standing). Modeling business-related problems using quantitative techniques. Focus is on applications to problems in the service and manufacturing sectors. Typical problem situations involve management of inventory, scheduling of people and processes and allocation of scarce resources.

## **SCMA 350. Introduction to Project Management. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: junior standing. Introductory exposure to and practice with the concepts of project management, the activities and skills of project managers, the prevalence of projects in organizations, and the value of project management skills for all managers. Students will employ project management terminology, participate in project work and engage in the appropriate technical and interpersonal processes for managing successful projects.

## **SCMA 386. Global Supply Chain Management. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: SCMA 320. Enrollment is restricted to students who have completed at least 54 credit hours (junior standing). Introduction to supply chains with emphasis on management, e-commerce and globalization. Topics covered include achievement of strategic fit among members of the chain; managing information system requirements; managing economies of scale, role of cycle inventory, impact of aggregation on risk and inventory; determining the optimal level of product availability, coordination and performance measurement.

## **SCMA 410. Logistics and Distribution Strategy. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: SCMA 320. This course provides an introduction to the principal analytical tools and methods used in supply chain management, including experience in solving relevant supply chain and logistics problems. The course content includes a heavy emphasis on the use of Microsoft Excel functions to develop modeling skills, including decision analysis, linear programming, heuristics and simulation for supply chain decision-making. Context areas for problem solving include supply chain network design, inventory management, transportation management, purchasing and demand management.

## **SCMA 420. Strategic Sourcing. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: SCMA 320. Procurement and strategic sourcing address the processes that facilitate the structure, creation and management of value-added transactions and relationships between supplier and customer organizations in a channel, supply chain and integrated value system context.

**SCMA 430. Data Management and Visualization. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: SCMA 303. This course is designed with the goal of equipping students with competencies in data management and visualization, with the intended product being an individual capable of developing analytically rigorous decision support tools, catered to specific managerial environments, which can be easily handed off for robust application by a range of intended users in those environments.

**SCMA 439. Process Management and Quality Control. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: SCMA 320. Enrollment is restricted to students who have completed at least 54 credit hours (junior standing). Critical concepts of process management from quality management and Six Sigma; service quality; systems thinking; process improvement strategy and methods; fact-based decision-making; collection and use of data in improvement projects; introduction to data analysis tools and techniques; statistical process control.

**SCMA 440. Data Mining and Forecasting. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: SCMA 302 or STAT 314. Enrollment is restricted to students who have completed at least 54 credit hours (junior standing). This course introduces nonmathematical managers to the major quantitative models designed for sound demand, competitive and system forecasting in today's complex and increasingly uncertain business environment. The course is useful for multiple business disciplines, including general management, marketing and finance. Topics include game theory, Markov processes, statistical quality control, exponential smoothing and seasonally adjusted trend analysis. Emphasis is placed on a general understanding of theory, mechanics, application potential, available software packages and templates.

**SCMA 491. Topics in Supply Chain Management and Analytics. 1-3 Hours.**

Semester course; variable hours. 1-3 credits. Students are restricted to a maximum total of 6 credits for all topics courses. Prerequisite: junior standing. An in-depth study of a selected business topic related to the disciplines in supply chain management and analytics, to be announced in advance.

**SCMA 492. Independent Study in Supply Chain Management and Analytics. 1-3 Hours.**

Semester course; 1-3 credits. Maximum total of 3 credits. Prerequisites: junior or senior standing as a major in a business curriculum and approval of adviser and department chair prior to course registration. Intensive study under supervision of a faculty member in an area not covered in depth or contained in the regular curriculum.

**SCMA 493. Internship in Supply Chain Management and Analytics. 3 Hours.**

Semester course; 3 credits. Prerequisites: senior standing in the major offering the internship and permission of the department chair. Intention to enroll must be indicated to the instructor prior to or during advance registration for semester of credit. Involves students in a meaningful experience in a setting appropriate to the major.

**SCMA 524. Statistical Fundamentals for Business Management. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Prerequisite: BUSN 171\*, BUSN 212\*\*, SCMA 500 or MATH 200. Develops an ability to interpret and analyze business data in a managerial decision-making context. Applications are stressed in the coverage of descriptive statistics, contingency tables, probability, sampling, correlation, confidence interval estimation, hypothesis testing and regression analysis. Business-oriented computational software will be used for data visualization and analysis. This is a foundation course. \*Formerly MGMT 171, SCMA 171; \*\*formerly MGMT 212, SCMA 212.

**SCMA 530. Fundamentals of the Legal Environment of Business. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. The legal environment of business is examined in view of common law principles, statutory provisions and administrative regulations affecting various forms of business organizations and management obligations to the company, its owner and the public. Role of ethics and key commercial law areas are examined including Uniform Commercial Code Provisions.

**SCMA 602. Global Supply Chain Management. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. This course explores supply, operations and logistics processes and how these processes are integrated with other functions within the firm and across organizations. The objective of this course is to provide students with knowledge of the fundamentals of supply chain management and how those concepts apply to business practice in a global setting.

**SCMA 603. SAP ERP and Supply Chain Management. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. This course focuses on the concept of enterprise information systems as the application of information technology to support the integration of organizational processes. SAP ERP software applications will focus on the design, plan and control of supply chain management processes. Students will have extensive hands-on activities, assignments and cases using a live SAP ERP system.

**SCMA 606. Supply Chain Innovation. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Students are introduced to cross-disciplinary principles pertaining to creativity, design, invention and innovation. The focus is learning and applying problem-solving methodologies to address complex, open-ended supply chain problems. Innovation from individual and team perspectives is addressed to hone more comprehensively students' problem-identification, information-gathering, conceptualization, evaluation and selection skills.

**SCMA 615. Strategic Logistics Management. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Corequisite: SCMA 524 or verified equivalent. This course is intended to provide an overview of the logistics function within an organization – highlighting how logistics systems can be strategically designed while also demonstrating how they are managed and improved. Specifically, the course is designed to give exposure to both inbound (procurement) and outbound (distribution) logistics. In general, the course will have a strategic flavor to it where students will be exposed to, but will not have time to become proficient in, the array of techniques used by managers in the logistics function.

**SCMA 632. Statistical Analysis and Modeling. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Prerequisite: BIOS 543, SCMA 302, SCMA 524, STAT 543 or ECON 501. Statistical analysis and modeling for decision analytics. Topics covered have an applied focus and may include logistic regression, bootstrap estimation, permutation tests, categorical data analysis, model selection, sparse methods and Bayesian methods. Statistical analysis of data will be conducted using business-oriented computational software.

**SCMA 642. Decision and Risk Analytics. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Prerequisite: BIOS 543, SCMA 301, SCMA 524 or STAT 543. Decision analytics uses diagrams and models to structure complex decisions, decomposing the alternatives, uncertainties and objectives to reveal the best strategy. The course will focus on gaining an understanding of decision analysis tools and software and facilitating decision-makers and stakeholders in building decision models. The probabilistic and statistical underpinnings of good decision-making and the psychology of bad decision-making will be covered. Students will develop solutions for case studies and complete a decision project.

**SCMA 643. Applied Multivariate Methods. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Prerequisite: SCMA 524, STAT/BIOS 543 or ECON 501. Study of multivariate statistical methods frequently used in business and analytics problems including principal components, factor analysis, discriminant analysis, MANOVA, logistic regression and cluster analysis. The focus is on applying these techniques through the use of a computer package.

**SCMA 646. Legal Foundations of Employment. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: SCMA 530 or MGMT 637. Examines the laws concerning human resources in organizations. Equal Employment Opportunity, wage and hours laws, Equal Pay Act, the Employee Retirement Income Security Act, the Occupational Safety and Health Act and employee personal rights laws are emphasized.

**SCMA 669. Developing and Implementing Forecasting Methods for Business. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Prerequisite: BIOS 543, ECON 501, SCMA 302, SCMA 524, STAT 541 or STAT 543. Forecasting methods and applications appropriate for managerial decision-making. Methods covered include moving average and exponential smoothing, seasonal adjustments, time series, forecast averaging, new-product forecasting, and combining managerial judgment and analytical forecasts. Particular emphasis is placed on developing and implementing forecasting techniques and other analytical tools in an interactive organization and appreciation of issues and caveats associated with each technique. Course includes data acquisition and teamwork along with effective consulting, communication and presentation skills.

**SCMA 675. Operations Management. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Prerequisite: BIOS 543, SCMA 301, SCMA 524, STAT 541 or STAT 543. A systematic investigation of the concepts and issues in designing, operating and controlling productive systems in both manufacturing and services.

**SCMA 677. Quality Management and Six Sigma. 3 Hours.**

Semester course; 3 lecture hours (delivered online, face-to-face or hybrid). 3 credits. Prerequisite: BIOS 543, SCMA 302, SCMA 524, STAT 541 or STAT 543. Concepts of quality management and Six Sigma: quality strategies, organizational quality assessment, Six Sigma process management tools and techniques, process control and improvement tools, the voice of the customer and the voice of the employee.

**SCMA 690. Research Seminar in Supply Chain Management. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Approval of proposed work is required by graduate studies office in the School of Business. This course is designed to provide research experience for candidates pursuing a non-thesis option.

**SCMA 691. Topics in Supply Chain Management and Analytics. 1-3 Hours.**

Semester course; 1-3 lecture hours. 1-3 credits. Study of current topics. Topics may vary from semester to semester.

**SCMA 693. Field Project in Supply Chain Management and Analytics. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: Approval of proposed work is required by graduate studies office in the School of Business. Students will work under the supervision of a faculty adviser in planning and carrying out a community-engaged research project. A written report of the investigations is required.

**SCMA 697. Guided Study in Supply Chain Management. 1-3 Hours.**

Semester course; variable hours. 1-3 credits. Prerequisite: Approval of proposed work is required by graduate studies office in the School of Business. Graduate students will submit a detailed outline of their research problem. They will be assigned reading and will prepare a written report on the problem. To be taken at the end of the program.