

BUSINESS, BACHELOR OF SCIENCE (B.S.) WITH A CONCENTRATION IN SUPPLY CHAIN MANAGEMENT AND ANALYTICS

The concentration in supply chain management and analytics gives students the skills to manage the manufacture and movement of products in the global environment and to understand the fundamentals of decision analytics. The curriculum is comprehensive in that supply chain management and analytics involve a range of issues from inventory management to risk management, as well as the indispensable role of information and technology in coordinating modern supply chains and analyzing data for the benefit of the organization.

Learning goals

Graduates will employ knowledge of supply chain management and effectively utilize analytics tools to provide insight and solutions to complex business issues.

Student learning outcomes

Upon completing this program, students will know and know how to do the following:

1. Demonstrate an understanding of the complexities of global supply chains
2. Demonstrate appropriate strategies to assess and manage uncertainty and risk
3. Identify environmental and social concerns in making supply chain management solutions
4. Employ analytics tools to support decision-making

Special requirements

The admission requirements for the School of Business (<http://bulletin.vcu.edu/undergraduate/business/undergraduate-information/academic-policies/>) detail the deadlines and other requirements for students to be admitted to one of these major programs of study. The following courses must be completed before the student may declare a specific business major: ACCT 203, ACCT 204, BUSN 201 or BUSN 205, BUSN 212 or MATH 200, BUSN 225, ECON 210, ECON 211, UNIV 111, UNIV 112 and UNIV 206.

The School of Business has special academic policies (<http://bulletin.vcu.edu/undergraduate/business/undergraduate-information/academic-policies/>), including policies on transfer credits, that apply to all undergraduate degrees.

All baccalaureate degree programs in the School of Business require successful completion of the business knowledge exam as administered in BUSN 499.

Students may need to take additional mathematics courses as prerequisites to BUSN 212 or MATH 200. These credits will count as open electives in the degree program.

No more than six credits from the INFO 16X Digital Literacy courses may be applied to the degree.

No more than four credits in physical education courses may be applied to the degree.

INTL 493 may not be counted toward a business degree.

Credit for SPCH 121 or SPCH 321 will substitute for BUSN 225, and no more than three credits of these courses may be applied toward a business degree. Students who earned a minimum grade of B in either ECON 203 or ECON 205 at VCU may substitute that credit for ECON 210.

The pass/fail grading policy may not be used for many course requirements. Students should check with their academic adviser before taking the pass/fail grading option.

Degree requirements for Business, Bachelor of Science (B.S.) with a concentration in supply chain management and analytics

Course	Title	Hours
General education (http://bulletin.vcu.edu/undergraduate/undergraduate-study/general-education-curriculum/)		
Select 12-13 credits from general education foundations and 17-18 credits from areas of inquiry.		30
Major requirements		
• Major core requirements		
MGMT 319	Leadership	3
SCMA 302	Business Statistics II	3
• Concentration requirements		
SCMA 303	Business Analytics	3
SCMA 386	Global Supply Chain Management	3
• Major electives		
SCMA electives (select from list below)		12
Non-SCMA electives (select from list below)		6
Ancillary requirements		
• Ancillary core requirements		
ACCT 203 & ACCT 204	Introduction to Accounting I and Introduction to Accounting II	6
BUSN 225	Winning Presentations	3
BUSN 301	Career and Professional Development	1
BUSN 499	Business Knowledge Exam	0
ECON 210	Principles of Microeconomics (satisfies general education BOK for social/behavioral sciences and/or AOI for global perspectives)	3
ECON 211	Principles of Macroeconomics	3
FIRE 311	Financial Management	3
INFO 360	Business Information Systems	3
MKTG 301	Marketing Principles	3
MGMT 303	Creativity and Ideation	3
MGMT 310	Managing People in Organizations	3
MGMT 434	Strategic Management	3
SCMA 301	Business Statistics I	3
SCMA 320	Production/Operations Management	3
• Additional ancillary requirements		
BUSN 201	Foundations of Business ¹	3

or BUSN 205	Introduction to the World of Business	
BUSN 212	Differential Calculus and Optimization for Business (either satisfies general education quantitative foundations)	3-4
or MATH 200	Calculus with Analytic Geometry I	
BUSN 323	Legal Environment of Business	3
or FIRE 325	Real Estate Law	
or FIRE 459	Insurance Law	
Open electives		
Select any course. ²		17
Total Hours		120

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BUSN 205 satisfies general education AOI for global perspectives.

2

Students may choose electives to reach the minimum total of 120 credits.

The minimum number of credit hours required for this degree is 120.

Approved electives

Course	Title	Hours
Select four of the following SCMA courses:		
SCMA 339	Quantitative Solutions for Supply Chain Management	3
SCMA 410	Logistics and Distribution Strategy	3
SCMA 420	Strategic Sourcing	3
SCMA 430	Data Management and Visualization	3
SCMA 439	Process Management and Quality Control	3
SCMA 440	Data Mining and Forecasting	3
SCMA 491	Topics in Supply Chain Management and Analytics	1-3
SCMA 492	Independent Study in Supply Chain Management and Analytics	1-3
SCMA 493	Internship in Supply Chain Management and Analytics	3
Select two of the following non-SCMA courses:		
BUSN 400 & BUSN 401 Principles of Consulting and International Consulting Practicum (If this option is chosen, both must be taken.)		6
ECON 303	Managerial Economics	3
INFO 361	Systems Analysis and Design	3
MGMT 389	Managerial Skills Development	3
MKTG 325	Business-to-business Marketing	3
MKTG 450	Product Development and Management	3

What follows is a sample plan that meets the prescribed requirements within a four-year course of study at VCU. Please contact your adviser before beginning course work toward a degree.

Freshman year		Hours
Fall semester		
BUSN 171	Mathematical Applications for Business (prerequisite for BUSN 212; counts as open elective)	3
UNIV 111	Focused Inquiry I (satisfies general education UNIV foundations)	3
Play course video for Focused Inquiry I		
General education course		3
General education course		3
General education course		3
Term Hours:		15
Spring semester		
BUSN 212	Differential Calculus and Optimization for Business (satisfies general education quantitative foundations)	3
BUSN 225	Winning Presentations	3
UNIV 112	Focused Inquiry II (satisfies general education UNIV foundations)	3
Play course video for Focused Inquiry II		
General education course		3
Open elective		3
Term Hours:		15
Sophomore year		
Fall semester		
ACCT 203	Introduction to Accounting I	3
BUSN 201	Foundations of Business or Introduction to the World of Business	3
or BUSN 205		
ECON 210	Principles of Microeconomics (satisfies general education BOK for social/behavioral sciences and/or AOI for global perspectives)	3
UNIV 200	Inquiry and the Craft of Argument (satisfies general education UNIV foundations)	3
General education course		3
Term Hours:		15
Spring semester		
ACCT 204	Introduction to Accounting II	3
BUSN 301	Career and Professional Development	1
ECON 211	Principles of Macroeconomics	3
MKTG 301	Marketing Principles	3
SCMA 301	Business Statistics I	3
Open elective		3
Term Hours:		16

Junior year

Fall semester

BUSN 323 or FIRE 325 or FIRE 459	Legal Environment of Business or Real Estate Law or Insurance Law	3
BUSN 325	Organizational Communication	3
MGMT 310	Managing People in Organizations	3
SCMA 302	Business Statistics II	3
SCMA 320	Production/Operations Management	3
Term Hours:		15
Spring semester		
INFO 360	Business Information Systems	3
MGMT 303	Creativity and Ideation	3
MGMT 319	Leadership	3
SCMA 303	Business Analytics	3
SCMA 386	Global Supply Chain Management	3
Term Hours:		15
Senior year		
Fall semester		
FIRE 311	Financial Management	3
SCMA electives		6
Non-SCMA elective		3
Open elective		3
Term Hours:		15
Spring semester		
BUSN 499	Business Knowledge Exam	0
MGMT 434	Strategic Management	3
SCMA electives		6
Non-SCMA elective		3
Open elective		2
Term Hours:		14
Total Hours:		120

The minimum number of credit hours required for this degree is 120.

Accelerated B.S. and M.D.A.

The accelerated B.S. and M.D.A. program allows qualified students to earn both the B.S. in Business with a concentration in supply chain management and analytics and Master of Decision Analytics in a minimum of five years by completing approved graduate courses during the senior year of their undergraduate program. Students in the program may count up to 12 credit hours of graduate courses toward both the B.S. and M.D.A. degrees. Thus, the two degrees may be earned with a minimum of 138 credits rather than the 150 credits necessary if the two degrees are pursued separately.

This accelerated program is for highly-motivated students who want to pursue advanced study in decision analytics. Students holding these degrees will be prepared to contribute to analytical decision making that supports the mission of a variety of organizations.

Admission to the program

Minimum qualifications for admittance to the program include completion of 85 undergraduate credit hours including SCMA 212 or MATH 200, SCMA 301, and SCMA 302 with a minimum grade of B and an overall GPA of 3.25. Students who received transfer credit for these

courses shall submit transcripts from previous institutions with their application so that performance in these classes can be evaluated. Successful applicants would enter the program in the fall semester of their senior year.

Undergraduate students must have departmental approval to participate in an accelerated program and must apply for admission to the master's program prior to beginning their final year of full-time undergraduate study. The entry term for the master's program will be the next available admission term following the last semester of undergraduate study. Admission to the master's program is provisional until the undergraduate degree has been conferred. Upon completion and conferral of the undergraduate degree, students are fully admitted to the master's program.

Students may be admitted after completing all courses listed as recommended for the junior year in the course sequence below; applications must be received no later than Nov. 1 for spring semester admission and no later than July 1 for fall semester admission.

Three reference letters (at least one from a School of Business faculty member) must accompany the application. Additionally, the application must include a personal statement that provides details concerning the student's interest in decision analytics and an explanation of how the accelerated program will help them achieve their career goals. Students who are interested in the accelerated program should consult with the faculty adviser to the master's program before they have completed 85 credits.

Once admitted into the accelerated program, students must meet the standards of performance applicable to graduate students as described in the "Satisfactory academic progress" section of the Graduate Bulletin, including maintaining a 3.0 GPA. Guidance to students admitted to the accelerated program is provided by both the undergraduate adviser and the faculty adviser to the graduate program.

Degree requirements

The Bachelor of Science in Business degree with a concentration in supply chain management and analytics will be awarded upon completion of a minimum of 120 credits and the satisfactory completion of all undergraduate degree requirements as stated in the undergraduate Bulletin.

A maximum of 12 graduate credits may be taken prior to completion of the baccalaureate degree. These graduate credits will substitute for the required major or open elective credits for the undergraduate degree. These courses are shared credits with the graduate program, meaning that they will be applied to both undergraduate and graduate degree requirements.

The graduate decision analytics courses that may be taken as an undergraduate, once a student is admitted to the program, are:

Course	Title	Hours
SCMA 632	Statistical Analysis and Modeling	3
SCMA 645	Advanced Decision Analytics	3
SCMA 648	Business Data Analytics	3
SCMA 669	Developing and Implementing Forecasting Methods for Business	3

Recommended course sequence/plan of study

What follows is the recommended plan of study for students interested in the accelerated program beginning in the fall of the junior year prior to admission to the accelerated program in the senior year.

Course	Title	Hours
Junior year		
Fall semester		
BUSN 323 or FIRE 325 or FIRE 459	Legal Environment of Business Real Estate Law Insurance Law	3
BUSN 325	Organizational Communication	3
MGMT 310	Managing People in Organizations	3
SCMA 302	Business Statistics II	3
SCMA 320	Production/Operations Management	3
Term Hours:		15
Spring semester		
INFO 360	Business Information Systems	3
MGMT 303	Creativity and Ideation	3
MGMT 319	Leadership	3
SCMA 303	Business Analytics	3
SCMA 386	Global Supply Chain Management	3
Term Hours:		15
Senior year		
Fall semester		
FIRE 311	Financial Management	3
SCMA 632	Statistical Analysis and Modeling	3
SCMA 648	Business Data Analytics	3
SCMA elective		3
Open elective		3
Term Hours:		15
Spring semester		
BUSN 499	Business Knowledge Exam	0
MGMT 434	Strategic Management	3
SCMA 645	Advanced Decision Analytics	3
SCMA 669	Developing and Implementing Forecasting Methods for Business	3
SCMA elective		3
Open elective		3
Term Hours:		15
Fifth year		
Fall semester		
INFO 364	Database Systems ¹	3
ECON 501	Introduction to Econometrics	3
Graduate program electives		6
Term Hours:		12
Spring semester		
INFO 610	Analysis and Design of Database Systems	3
Graduate program electives		6
Term Hours:		9

INFO 364 is a prerequisite for INFO 610, a requirement for the Master of Decision Analytics. It is not a requirement for the B.S. in Business with a concentration in supply chain management and analytics, therefore it is recommended that INFO 364 be completed in Year 5, just prior to INFO 610.

Accelerated B.S. and M.S.C.M.

The accelerated B.S. and M.S.C.M. program allows qualified students to earn both the B.S. in Business with a concentration in supply chain management and analytics and Master of Supply Chain Management in a minimum of five years by completing approved graduate courses during the senior year of their undergraduate program. Students in the program may count up to 12 hours of graduate courses toward both the B.S. and M.S.C.M. degrees. Thus, the two degrees may be earned with a minimum of 138 credits rather than the 150 credits necessary if the two degrees are pursued separately.

Students holding these degrees are prepared for corporate and government supply chain management positions using data analytics, leadership skills and global perspectives.

Admission to the program

Minimum qualifications for admittance to the program include completion of 85 undergraduate credit hours including SCMA 212 or MATH 200, SCMA 301, and SCMA 302 with a minimum grade of B and an overall GPA of 3.25. Successful applicants would enter the program in the fall semester of their senior year. Students who do not meet the minimum GPA requirements may submit GRE scores to receive further consideration.

Undergraduate students must have departmental approval to participate in an accelerated program. Students may be admitted after completing all courses listed as recommended for the junior year in the course sequence below; applications must be received no later than Nov. 1 for spring semester admission and no later than July 1 for fall semester admission.

Three reference letters (at least one from a supply chain management and analytics department faculty member) must accompany the application. Students who are interested in the accelerated program should consult with the faculty adviser to the master's program before they have completed 85 credits.

Once admitted into the accelerated program, students must meet the standards of performance applicable to graduate students as described in the "Satisfactory academic progress" section of the Graduate Bulletin, including maintaining a 3.0 GPA. Guidance to students admitted to the accelerated program is provided by both the undergraduate adviser and the faculty adviser to the graduate program.

Degree requirements

The Bachelor of Science in Business degree with a concentration in supply chain management and analytics will be awarded upon completion of a minimum of 120 credits and the satisfactory completion of all undergraduate degree requirements as stated in the Undergraduate Bulletin.

A maximum of 12 graduate credits may be taken prior to completion of the baccalaureate degree. These graduate credits will substitute for the required major or open electives for the undergraduate degree. These

courses are shared credits with the graduate program, meaning that they will be applied to both undergraduate and graduate degree requirements.

The graduate courses for the M.S.C.M. that may be taken as an undergraduate, once a student is admitted to the program, are:

Course	Title	Hours
SCMA 602	Global Supply Chain Management	3
SCMA 675	Operations Management	3
MSCM program electives		6

Recommended course sequence/plan of study

What follows is the recommended plan of study for students interested in the accelerated program beginning in the fall of the junior year prior to admission to the accelerated program in the senior year.

Course	Title	Hours
Junior year		
Fall semester		
BUSN 323	Legal Environment of Business	3
or FIRE 325	Real Estate Law	
or FIRE 459	Insurance Law	
BUSN 325	Organizational Communication	3
MGMT 310	Managing People in Organizations	3
SCMA 302	Business Statistics II	3
SCMA 320	Production/Operations Management	3
Term Hours:		15
Spring semester		
INFO 360	Business Information Systems	3
MGMT 303	Creativity and Ideation	3
MGMT 319	Leadership	3
SCMA 303	Business Analytics	3
SCMA 386	Global Supply Chain Management	3
Term Hours:		15
Senior year		
Fall semester		
FIRE 311	Financial Management	3
SCMA 675	Operations Management	3
SCMA electives		6
MSCM program elective		3
Term Hours:		15
Spring semester		
BUSN 499	Business Knowledge Exam	0
MGMT 434	Strategic Management	3
SCMA 602	Global Supply Chain Management	3
SCMA elective		3
MSCM program elective		3
Open elective		2
Term Hours:		14
Summer semester		
SCMA 603	SAP ERP and Supply Chain Management	3
SCMA 606	Supply Chain Innovation	3
Term Hours:		6

Fifth year

Fall semester		
SCMA 645	Advanced Decision Analytics	3
SCMA 697	Guided Study in Supply Chain Management	3
MSCM program electives		6
Term Hours:		12

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. 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. 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. 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.