

# SUPPLY CHAIN MANAGEMENT

Supply chain management is an integrated program of study concerned with the efficient flow of information, materials, and products within and among organizations. Supply chain management involves the integration of business processes across organizations, from material sources and suppliers through manufacturing, and processing to the final customer. The program's balanced approach includes courses in the three core areas of supply chain management: procurement, operations, and logistics. Students will develop knowledge related to a wide variety of supply chain activities, including demand planning, purchasing, transportation management, warehouse management, inventory control, material handling, product and service support, information technology, and strategic supply chain management.

## Undergraduate Major in Supply Chain Management

**For undergraduate curriculum in business, major in supply chain management.**

The Department of Supply Chain Management offers a major in supply chain management. Students will complete the general education requirements (including business foundation courses), business core requirements for the bachelor of science (B.S.) degree, and 18 additional credits in the major.

The instructional objective of the supply chain management major is to prepare students for professional careers in logistics analysis, plant management, procurement, warehouse management, sustainable supply chain management, and consulting. The curriculum provides the required theoretical and conceptual base and analytical methods for making sound operational and strategic business decisions related to all activities in a supply chain.

Students are limited to three business majors/degrees within the Ivy College of Business, or a total of three business majors/minors within the college. This limit is on business majors/degrees/minors only, and does not apply to multiple majors/degrees/minors taken outside the Ivy College of Business.

For more information on the undergraduate major in Supply Chain Management, please visit: <https://ivybusiness.iastate.edu/undergraduate/majors-minors/supply-chain-management/>

## Undergraduate Minor in Supply Chain Management

The Department of Supply Chain Management also offers a minor for non-Supply Chain Management majors in the Ivy College of Business. The minor requires 15 credits from an approved list of courses, including at least 6 credits in courses numbered 300 or above taken at Iowa State University with a grade of C or higher. The minor must include at least 9 credits that are not used to meet any other department, college, or

university requirement. Students with declared majors have priority over students with declared minors in courses with space constraints.

Required Courses (6 credits):

SCM 301	Supply Chain Management	3
SCM 486	Principles of Purchasing and Supply Management	3

Elective Courses (9 credits):

Select one elective course from:

SCM 424	Process Management, Analysis, and Improvement	
SCM 450	Enterprise Resource Planning Systems in Supply Chain	
SCM 453	Supply Chain Planning and Control	

Select one elective course from:

SCM 460	Decision Tools for Logistics and Operations Management	
SCM 461	Principles of Transportation	
SCM 462	Transportation Carrier Management *	
SCM 466	Global Trade Management	

Select one additional elective course from either section above.

\* Courses not offered on a regular basis. Students should consult with their academic advisor about terms of offering.

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For more information on the undergraduate minor in Supply Chain Management, please visit: <https://ivybusiness.iastate.edu/undergraduate/majors-minors/>

### Curriculum:

In addition to the basic business requirements, Supply Chain Management majors must also complete:

Required Courses (15 credits):

SCM 424	Process Management, Analysis, and Improvement	3
SCM 453	Supply Chain Planning and Control	3
SCM 460	Decision Tools for Logistics and Operations Management	3
SCM 461	Principles of Transportation	3
SCM 486	Principles of Purchasing and Supply Management	3

Elective Courses (3 credits):

Select one elective from the following list:

SCM 340	Project Management	3
SCM 428	Special Topics in Operations Management *	3
SCM 430	Supply Chain Analytics *	3
SCM 434X	Implementing Process Improvement *	3
SCM 440	Supply Chain Information Systems	3
SCM 450	Enterprise Resource Planning Systems in Supply Chain	3
SCM 462	Transportation Carrier Management *	3
SCM 466	Global Trade Management	3
SCM 471	Sustainable Supply Chain Management *	3
SCM 491	International Live Case and Study Tour	3
SCM 492X	Supply Chain Management Live Case *	3
SCM 495	Case Practicum #	3

\* Courses not offered on a regular basis. Students should consult with their academic advisor about terms of offering.

# Only 3 credits of SCM 495 may count as a Supply Chain Management major choice elective.

The X designation after a course number indicates this is an experimental course offered by the Department. Although in an experimental phase, these courses are open for registration just the same as permanent courses listed in the course catalog and count as elective choices in the major.

Supply Chain Management, B.S.

*Sample 4-Year Plan (Your plan may differ)*

#### Freshman

Fall	Credits Spring	Credits
BUSAD 102 or 103	1 ECON 102	3
ECON 101	3 STAT 226	3
COM S 113	3 ACCT 284	3
ENGL 150	3 SP CM 212	3
MATH 150	3 BUSAD 203	1
LIB 160	1 HUM/SOC SCI	3
	<b>14</b>	<b>16</b>

#### Sophomore

Fall	Credits Spring	Credits
ACCT 285	3 PHIL 230	3
SCM 301	3 SCM 424	3
ENGL 250	3 Core Business Course	3
Natural Science	3 ACCT 215	3
MATH 151	3 HUM/SOC SCI	3
	<b>15</b>	<b>15</b>

#### Junior

Fall	Credits Spring	Credits
SCM 453	3 SCM 460	3
Core Business Courses	6 SCM 461	3
Global/International Perspective <sup>@</sup>	3 Core Business Course	3
US Diversity <sup>#</sup>	3 Global/International Perspective <sup>@</sup>	3
General Elective	2 General Elective	3
	<b>17</b>	<b>15</b>

#### Senior

Fall	Credits Spring	Credits
SCM 486	3 SCM Elective	3
Core Business Courses	6 HUM/SOC SCI	3
ENGL 302	3 MGMT 478*	3
General Elective	3 General Electives	6
	<b>15</b>	<b>15</b>

**Total Credits: 122**

@ Courses in these requirements may also be used as Global Perspective.

# US Diversity courses may be used to satisfy HUM/SOC SCI.

\* All core classes must be completed prior to taking MGMT 478 in the graduating semester.

Students must be admitted to the professional program in business to major in supply chain management. The requirements to enter the professional program are:

1. Completion of at least 30 credits, Foundation Courses, ENGL 150, and all ENGL 101/99 courses if required.

2. A minimum GPA of 2.50 either cumulative or in the Foundation Courses. Early admission is allowed for Honors-eligible students. (See your advisor for specific information)

Graduation Requirements:

1. Grade of "C" or higher in at least 30 credits of Core and Major courses.

2. 42 credits of 300+ level courses from a four-year institution.

3. 50% of required Business courses must be earned at ISU.

4. At least 32 credits and the LAST 32 credits must be earned at ISU (exceptions for study abroad and internship may be requested).

5. 122 Credits minimum and a Cumulative GPA of at least 2.00 with no quality point deficiencies.

6. A grade of C or better in ENGL 250 required, and also in one other required ENGL course.

7. All 300-level and higher business credits must be earned at a four-year college.

8. Multiple business **majors** must have at least 15 distinct credits in each of the major requirements; when applicable, one course can be shared between business majors; see your advisor regarding multiple business **degree requirements**.

## Graduate Study

The Department of Supply Chain Management participates in the full-time and part-time Master of Business Administration (MBA) and in the PhD in Business and Technology programs. The department also participates in the interdepartmental MS in Transportation program.

The MBA program is a 48-credit, non-thesis, non-creative component curriculum. Thirty of the 48 credits are core courses and the remaining 18 are graduate electives. Within the MBA program, students can obtain a specialization in Supply Chain Management.

For more information about the MBA program with a specialization in Supply Chain Management, please visit: <https://ivybusiness.iastate.edu/masters/mba/>

The PhD in Business and Technology is a 56-credit curriculum (minimum) that culminates in a dissertation. Students may select Supply Chain Management (SCM) as their major area of specialization. The primary objective of the SCM specialization is to prepare students for careers in research universities. The SCM domain is broad and includes the design, development and control of business processes for the conversion of inputs into outputs and distribution of those outputs. The traditional focus of SCM was on integration of processes across multiple functions within the firm—operations management, logistics, and purchasing primarily, with elements of marketing and information systems also included. However, in today's world, with competition across supply chain networks, SCM also involves integrating business processes across firms. Research in this area is therefore interdisciplinary in nature and addresses both intra- and inter-organizational issues.

Ph.D. core curriculum	6
Doctoral seminars and research practicum in the area of specialization	14
Minor area (9 cr.) plus electives (3 cr.)	12
Research methods courses	12

Dissertation	12
<b>Total Credits</b>	<b>56</b>

For more information about the PhD program with a specialization in Supply Chain Management, please visit: <https://ivybusiness.iastate.edu/phd/>

## Graduate Certificate

The online graduate certificate in Supply Chain Management will provide foundational concepts and applied technical skills that supply chain professionals need to effectively manage a global supply chain.

The certificate is for working professionals as well as students enrolled in graduate programs who are employed or seeking a career as a business analyst, supply chain analyst, or who want to move into a supply chain position.

For more information about the graduate certificate in Supply Chain Management, please visit: <https://ivybusiness.iastate.edu/masters/graduate-certificates/>

### Courses primarily for undergraduates:

#### SCM 301: Supply Chain Management

(3-0) Cr. 3.

*Prereq: ECON 101 and STAT 226*

Various supply chain activities and integration of supply chain management with supply and demand, both within and between firms. Exposure to a wide range of supply chain management terminology, analytical tools, and theories related to four key elements of supply chain management: purchasing, operations, distribution, and integration. Specific topics include strategic sourcing, supply management, demand forecasting, resource planning, inventory management, process management, logistics, location analysis, process integration, and performance measurement.

#### SCM 340: Project Management

(Cross-listed with MIS). (3-0) Cr. 3.

*Prereq: credit or enrollment in MIS 301*

Equips students to support team activities in the general project management environment and better manage their careers. Practical experience using project management techniques and tools. Course topics include project initiation and execution, risk assessment, estimating and contracts, planning, human factors, and standard methods.

**SCM 424: Process Management, Analysis, and Improvement**

(3-0) Cr. 3.

*Prereq: SCM 301*

The design, analysis, and management of production processes to improve performance. Performance measures and their relationships; process design and evaluation; and managerial levers for improving and controlling process performance.

**SCM 428: Special Topics in Operations Management**

(3-0) Cr. 3.

*Prereq: SCM 301*

In-depth analysis of current issues, problems, and systems in operations management with emphasis on new theoretical and methodological developments. Topics may include in different semesters, supply chain management, productivity and quality improvement, management of technology and innovation, information technology in operations management, quick response manufacturing, and service operations management.

**SCM 430: Supply Chain Analytics**

Cr. 3. Alt. S., offered irregularly.

*Prereq: SCM 301*

Introduces key methods and tools (i.e., analytics) applied to decision making in supply chain practice. Use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions. Descriptive, prescriptive or predictive use activities. Use of software (e.g., R and AnyLogic) to learn key concepts and techniques in analytics and apply those concepts to examples of supply chain decision making.

**SCM 440: Supply Chain Information Systems**

(Cross-listed with MIS). (3-0) Cr. 3.

*Prereq: MIS 301, SCM 301*

Internal and inter-organizational information systems necessary for a supply chain to achieve competitive advantage. Topics include: design, development, implementation, and maintenance of supply chain information systems; enterprise resource planning; advanced planning and scheduling, manufacturing execution systems; and the interface between manufacturing planning and control processes, logistics processes, and the information system.

**SCM 450: Enterprise Resource Planning Systems in Supply Chain**

(Cross-listed with MIS). (3-0) Cr. 3.

*Prereq: SCM 301, MIS 301 or IE 148, IE 341*

Examination of the role of enterprise resource planning systems (ERP) in the supply chain. Hands-on experience with a major software application in use by many corporations to manage and improve the efficiency of their supply chains and operations. Students will develop a more process-centric perspective about how a supply chain operates and how ERP enables and supports such operations.

**SCM 453: Supply Chain Planning and Control**

(3-0) Cr. 3. F.

*Prereq: SCM 301*

Supply chain planning and control is the process which synchronizes demand with manufacturing and distribution. This course will cover sales and operations planning with emphasis on forecasting, master scheduling, materials requirements planning, inventory management and demand planning. Linking business plans and information systems for integration and distribution channels are also covered.

**SCM 460: Decision Tools for Logistics and Operations Management**

(3-0) Cr. 3.

*Prereq: SCM 301*

Technical tools and skills required for problem solving and decision making in logistics and operations management. Transportation and network planning, inventory decision making, facility location planning, vehicle routing, scheduling, and production planning. Quantitative tools include linear and integer programming, non-linear programming, and simulation. Emphasis on the use of PC-based spreadsheet programs.

**SCM 461: Principles of Transportation**

(3-0) Cr. 3.

*Prereq: SCM 301*

Economic, operating, and service characteristics of the various modes of transportation, with a special emphasis on freight transportation. Factors that influence transport demand, costs, market structures, carrier pricing, and carrier operating and service characteristics and their influence on other supply chain costs and supply chain performance.

**SCM 462: Transportation Carrier Management**

(3-0) Cr. 3.

*Prereq: Credit or enrollment in SCM 461*

Analysis of transport users' requirements. Carrier management problems involving ownership and mergers, routes, competition, labor, and other decision areas.

**SCM 466: Global Trade Management**

(3-0) Cr. 3. F.S.

*Prereq: SCM 301*

Logistics systems and legal framework for the international movement of goods. Operational characteristics of providers of exporting and importing services. The effects of government trade policies on global logistics.

**SCM 471: Sustainable Supply Chain Management**

Cr. 3. Alt. F., offered irregularly. Alt. S., offered irregularly.

*Prereq: SCM 301*

The global nature of a supply chain causes many sustainability issues. This course will consider how supply chain design and execution affect sustainability. Some discussion of governmental policy will be included.

**SCM 486: Principles of Purchasing and Supply Management**

(3-0) Cr. 3.

*Prereq: SCM 301*

Sourcing strategies, concepts, tools and dynamics in the context of the integrated supply chain. Make or buy decision, supplier evaluation and selection, global sourcing, the total cost of ownership, contracts and legal terms, negotiation, purchasing ethics, and information systems requirements.

**SCM 490: Independent Study**

Cr. 1-3. Repeatable.

*Prereq: SCM 301, senior classification, permission of instructor***SCM 491: International Live Case and Study Tour**

Cr. 3. S.

*Prereq: SCM 301*

Students follow supply chain of major firm from overseas manufacturer to domestic point-of-sale. Students are expected to complete projects and present findings to senior leadership.

**SCM 495: Case Practicum**

(3-0) Cr. 3. Repeatable. F.S.

*Prereq: SCM 301*

Students explore different practical scenarios related supply chain projects and cases. Students acquire necessary skills and knowledge to solve practical issues associated with presented cases and problems. Students compete at different venues around the country.

**Courses primarily for graduate students, open to qualified undergraduates:**

**SCM 501: Supply Chain Management**

(3-0) Cr. 3.

*Prereq: Enrollment in MBA program or departmental permission*

Introduction to supply chain management including aspects of operations, logistics and global supply chain strategy development. Topic areas include lean manufacturing and value stream mapping; supplier development and measurement; sustainable supply chain operations; process measurement, management and improvement; supply chain risk and uncertainty; visibility and integration in the supply chain; and inventory control.

**SCM 513: Biorenewables Supply Chain Management**

Cr. 3. Repeatable, maximum of 1 times. S.

*Prereq: Graduate Standing or Qualified Undergraduate with Instructor Permission*

Evaluation of supply chain logistics related to the field of biorenewables. Unique challenges associated with the biorenewables supply chain are emphasized and examined: cost analysis, market demand & prices, life cycle analysis, environmental impacts, as well as the technological, social, and political factors related to society.

**SCM 520: Decision Models for Supply Chain Management**

(3-0) Cr. 3.

*Prereq: SCM 501 or permission of instructor*

The application of decision models for supply chain management. Topics include business applications of decision theory, inventory theory, business forecasting, optimization models, transportation and network models, routing problems, and project management.

**SCM 524: Strategic Process Analysis and Improvement**

(3-0) Cr. 3.

*Prereq: SCM 501 or permission of instructor*

Analysis, management, and improvement of the business processes used to produce and deliver products and services that satisfy customer needs. Process attributes that managers can control to influence the key operational performance measures of throughput time, inventory, cost, quality, and flexibility are discussed. Topics such as theory of constraints, lean production, and six sigma are included.

**SCM 553: Supply Chain Planning and Control**

Cr. 3. Alt. F., offered irregularly. Alt. S., offered irregularly.

*Prereq: SCM 501 or permission of instructor*

Supply chain planning and control is the process which synchronizes demand with manufacturing and distribution. Sales and operations planning with emphasis on forecasting, master scheduling, materials requirements planning, inventory management and demand planning. Linking business plans and information systems for integration and distribution channels are also covered. Emphasis on the strategic advantages of linking business plans and demand forecasts.

**SCM 560: Strategic Logistics Management**

(3-0) Cr. 3.

*Prereq: SCM 501 or permission of instructor*

Positions logistics vis-a-vis supply chain management (SCM). Presents different perspectives on SCM vs. logistics. Describes primary logistics functions: transportation, warehousing, facility location, customer service, order processing, inventory management and packaging. Benefits of and obstacles to the integration of these functions.

**SCM 561: Transportation Management and Policy**

(3-0) Cr. 3.

*Prereq: SCM 501 or permission of instructor*

Analysis of contemporary issues and strategies in transportation management and policy. Emphasis on evaluation of the impacts of transportation policies, new technologies, and strategic carrier and shipper management practices on the freight transportation industry and logistics systems.

**SCM 563: Purchasing and Supply Management**

(3-0) Cr. 3.

*Prereq: SCM 501 or permission of instructor*

Mechanics, procedures and tools used in purchasing. Recruiting, selecting, developing and managing supply chain partners in order to achieve competitive advantage via superior supply chain management. Factors and information needs for making supply management decisions.

**SCM 590: Special Topics**

Cr. 1-3. Repeatable.

*Prereq: Graduate classification and permission of instructor*

For students who wish to do individual research in a particular area of supply chain management.

**Courses for graduate students:**

**SCM 601: Theoretical Foundations of Supply Chain Management**

(3-0) Cr. 3.

*Prereq: MGMT 601 or permission of instructor*

An overview of the development of supply chain management (SCM) theory, including review of seminal articles in logistics, operations, and purchasing management and theories from allied disciplines (e.g., economics, marketing, sociology, strategic management). Analysis of trends in SCM research topics and methodologies. Identification of emerging and future areas for research and theory development.

**SCM 602: Seminar in Supply Chain Strategy**

(3-0) Cr. 3.

*Prereq: SCM 601 or concurrent enrollment*

Review of research literature on supply chain strategy, including the impact of technology, global economic and social factors, and intra- and inter-organizational integration on supply chain strategy formation. The role of SCM in overall corporate strategy and the impact of SCM on firm performance will also be addressed.

**SCM 603: Seminar in Purchasing**

(3-0) Cr. 3.

*Prereq: SCM 601 or concurrent enrollment*

Review of classic purchasing theories. Discussion of contemporary supply management strategy; the role of supply management and its relationship with other functional areas; its impact on logistics and transportation issues; management of supply uncertainties.

**SCM 604: Seminar in Logistics Management**

(3-0) Cr. 3.

*Prereq: SCM 601 or concurrent enrollment*

Integration of network, economic, and systems theory in the design, management, and control of logistics systems in the context of integrated supply chain management. Functional areas addressed include transportation, inventory order fulfillment, distribution, and warehousing. Facility location analysis will also be covered.

**SCM 605: Seminar in Operations Management**

(3-0) Cr. 3.

*Prereq: SCM 601 or concurrent enrollment*

Review of the research literature on methods of organizing, planning, controlling, and improving manufacturing systems to achieve the desired performance objectives related to cost, quality, speed, and flexibility. The relationship between the performance of the manufacturing system and the performance of the supply chain system will also be discussed.

**SCM 609: Special Topics in SCM**

Cr. 3. Repeatable. Alt. F., offered irregularly. Alt. S., offered irregularly.

*Prereq: SCM 601 or permission of instructor.*

Review of current issues in SCM. Provides opportunities to read and discuss research articles that made important contributions in SCM literature.

**SCM 650: Research Practicum I**

(1-0) Cr. 1.

*Prereq: enrollment in the PhD program*

Preparation of a research manuscript to be submitted to a peer-reviewed academic journal. Students will work with a faculty mentor on a research project.

**SCM 651: Research Practicum II**

(1-0) Cr. 1.

*Prereq: enrollment in the PhD program*

Preparation of a second research manuscript to be submitted to a peer-reviewed academic journal. Although students work under the supervision of a faculty mentor, the students will take independent responsibility for the research project.

**SCM 699: Dissertation**

Cr. 12.

*Prereq: Graduate classification, permission of dissertation supervisor*

Research.