

# O M - Operations Management

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## Operations Management: O M

### Lower-Division Courses

### Upper-Division Courses

#### **O M 320F. Foundations of Operations and Supply Chain Management.**

Restricted to non-McCombs School of Business majors. Three lecture hours a week for one semester. Only one of the following may be counted: Operations Management 320F, 334M, 235, 235H. Prerequisite: Forty-five semester hours of college coursework.

#### **O M 334M. Healthcare Operations Management.**

Overview of healthcare operations management. Focus on process diagramming, vocabulary, and analysis of effects of variability on healthcare operations in terms of increasing waiting lines, inventory, and patient safety issues. Focus on modern process improvement methodologies. Three lecture hours a week for one semester. Only one of the following may be counted: Operations Management 320F, 334M, 235, 235H. Offered on the letter-grade basis only. Prerequisite: Upper-division standing, and credit or registration for one of the following: Advertising 309R, 344K, Biomedical Engineering 335, Economics 329, Educational Psychology 371, Mathematics 316, 358K, Statistics 301, 301H, 309, 309H, Statistics and Data Sciences 301, 302, 302F, 304, 306, 320E, 320H, 325H, 328M.

#### **O M 135, 235, 335. Operations Management.**

Restricted to students in the McCombs School of Business. The operations or production function and the skills required for analyzing and solving related problems. For each semester hour of credit earned, one lecture hour a week for one semester. Only one of the following may be counted: Operations Management 320F, 334M, 235, 235H. Offered on the letter-grade basis only. Prerequisite: Credit or registration for Statistics 301, 301H, 309 or 309H.

#### **O M 235H, 335H. Operations Management: Honors.**

Restricted to students in the McCombs School of Business Honors Program. An investigation of the operations or production function, and the skills required for analyzing and solving related problems. The equivalent of one lecture hour a week for one semester. Only one of the following may be counted: Operations Management 320F, 334M, 235, 235H. Offered on the letter-grade basis only. Prerequisite: Business Administration 324H, Economics 304K and 304L, and Statistics 301, 301H, 309 or 309H.

#### **O M 338. Supply Chain Modeling and Optimization.**

Same as Business Analytics 338. Restricted to students in a business major. Framing, formulating, and applying quantitative optimization and descriptive models to support supply chain and operations management decisions, using spreadsheets and other software. Requires familiarity with spreadsheets. Three lecture hours a week for one semester. Only one of the following may be counted: Operations Management 337 (Topic 2), 338, Business Analytics 338. Offered on the letter-grade basis only. Prerequisite: Operations Management 334M, 235, or 235H.

#### **O M 140S, 240S, 340S, 440S, 540S, 640S, 740S, 840S, 940S. Topics in Operations Management.**

This course is used to record credit the student earns while enrolled at another institution in a program administered by the University's Study Abroad Office or the school's BBA Exchange Programs. Credit is

recorded as assigned by the study abroad adviser in the Department of Information, Risk, and Operations Management. University credit is awarded for work in an exchange program; it may be counted as coursework taken in residence. May be repeated for credit when the topics vary.

#### **O M 350. Digital Transformation of Supply Chain Management.**

Restricted to students in a business major. Study strategic frameworks for facilitating the digital transformation of supply chains and operations management to align with a firm's business model. Explore the tactical deployment of digital capabilities and the use of data analytics to transform operational processes to improve efficiency, quality, and timing. Three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Operations Management 235, 235H or 334M.

#### **O M 360. Procurement and Supplier Management.**

Same as International Business 372T (Topic 2). Restricted to students in a business major. Explore strategic issues in procurement and supplier management; a review of competitive analysis and benchmarking; the purchasing role in fulfilling a firm's operational and competitive strategies; supplier evaluation, development, and relationship management; negotiating with suppliers for results; and commodity planning. Three lecture hours a week for one semester. Only one of the following may be counted: International Business 372 (Topic: Procurement/Supplier Mgmt), 372 (Topic 13), 372T (Topic 2), Operations Management 337 (Topic 3), 360. Prerequisite: Operations Management 334M, 235 or 235H with a grade of at least C-.

#### **O M 366P. Operations Management Practicum.**

Restricted to students in a business major. Students apply skills in their major area and focus on additional project management skills through group projects conducted in a professional setting. Students may work with a private or a public enterprise. The equivalent of three lecture hours a week for one semester. Offered on the letter-grade basis only. Prerequisite: Completion of at least forty-five semester hours of college coursework, and credit or registration for Operations Management 334M, 235, or 235H.

#### **O M 370. Supply Chain Design, Planning, and Execution.**

Restricted to students in a business major. Analyze the entire flow of information, materials, and services from suppliers through factories and warehouses to the end customer. Examine logistics, supplier selection, and inventory management using case studies, optimization, and simulation. Three lecture hours a week for one semester. Operations Management 368 and 370 may not both be counted. Prerequisite: Operations Management 334M or 235 or 235H, with a grade of at least C-; and credit or registration for 338.

#### **O M 372T. Topics in Operations Management.**

Restricted to students in a business major. Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Varies with the topic.

**Topic 1: Total Quality Management.** Operations Management 337 (Topic 1) and 372T (Topic 1) may not both be counted. Additional prerequisite: For business majors, Operations Management 334M, 235, or 235H with a grade of at least C-; for others, admission to an appropriate major sequence in engineering.

**Topic 2: Sustainable Operations.** Operations Management 337 (Topic: Sustainable Operations) and 372T (Topic 2) may not both be counted.

**Topic 5: Project Management.** Operations Management 337 (Topic 5) and 372T (Topic 5) may not both be counted. Additional prerequisite: Upper-division standing.

**Topic 7: New Product Development.** Examine the integration of supply chain management into the product design and development process. Learn skills and knowledge involving product development and incorporating supply chain considerations with an emphasis on designing products that optimize the supply chain while maintaining the products vision from concept to customer. Operations Management 337 (Topic 7) and 372T (Topic 7) may not both be counted. Additional prerequisite: Upper-division standing.

**Topic 12: Information Technology for Supply Chains.** Same as Management Information Systems 372T (Topic 12). Learn how information technology is used to coordinate supply chain activities across different industries. Only one of the following may be counted: Management Information Systems 373 (Topic 13), 372T (Topic 12), Operations Management 337 (Topic 4), 372T (Topic 12). Additional prerequisite: Management Information Systems 301, 301H, or 302F with a grade of at least C-.

**Topic 17: Health Care Analytics.** Same as Business Analytics 372T (Topic 17) and Management Information Systems 372T (Topic 17). Explore key management challenges and how data may be leveraged to guide decisions and improve operations, with the unifying theme of providing health care services in a manner that leads to lower cost and higher quality. Only one of the following may be counted: Business Analytics 372 (Topic 17), 372T (Topic 17), Management Information Systems 373 (Topic 26), 372T (Topic 17) Operations Management 337 (Topic 8), 372T (Topic 17).

**Topic 20: Supply Chain Analytics.** Same as Business Analytics 372T (Topic 20). Study dynamic demand forecasting models based on both data aggregation as well as hierarchical aggregation of point-of-sale predictive analytics. Explore the use of developed predictive dynamic models for operations planning and operations decision making. Only one of the following may be counted: Business Analytics 372 (Topic 16), 372T (Topic 20), Operations Management 337 (Topic 6), 372T (Topic 20). Additional prerequisite: Credit or registration for Operations Management 334M, 235 or 235H.

### **O M 375. Supply Chain and Operations Management Strategy.**

Same as International Business 375C. Restricted to students in a business major. Discuss the role of supply chain management to increase a firm's competitive performance and understand how that performance affects the economy and society as a whole. Examine supply chain and operations design as well as environmental, social, and governance (ESG) issues. Explore the impact of new business models including e-commerce and automation; contracting; outsourcing and vertical integration, resiliency; and new delivery modalities. Three lecture hours a week for one semester. Only one of the following may be counted: International Business 367, 375C, Operations Management 367, 375. Prerequisite: Operations Management 334M, 235, or 235H with a grade of at least C-; Operations Management 338; and credit or registration for Operations Management 368 or 370.

### **O M 179, 379. Independent Research in Operations Management.**

Restricted to students in a business major. Conference course. Only one of the following may be counted: Accounting 379C, Business Administration Honors 379, Business, Government, and Society 379, Finance 379C, International Business 379C, Legal Environment of Business 379, Management 379C, Management Information Systems 379, Marketing 379C, Operations Management 379, Risk Management 379. Prerequisite: Eighteen semester hours of coursework in business and economics, six of which must be upper-division; Management 336 or 336H, Operations Management 334M or 235 or 235H with a grade of at least C-; consent of instructor; and written approval before the

first meeting of the course from the department chair's office on forms available for that purpose.

## **Graduate Courses**

### **O M 380. Seminar in Operations Management.**

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing; additional prerequisites vary with the topic.

**Topic 1: Combinatorial Optimization.** Concepts of computational complexity; the foundation of discrete mathematics and combinatorial theory.

**Topic 2: Linear Programming.** Model formulation: solution algorithms; duality theory; decomposition; sparse matrix issues; sensitivity and parametric analysis; optimization and matrix generation computer software.

**Topic 3: Network Optimization.** Applications, theory, and algorithms of the shortest path, maximum flow, and minimum cost flow problems. Discussion of classic and contemporary aspects of network optimization, including auction algorithms and cost-scaling techniques, to provide an integrated view of theory, algorithms, and applications. Additional prerequisite: Coursework in linear algebra and introductory coursework in operations management.

**Topic 4: Algorithms and Implementations.** Design, analysis, implementation, and use of computer algorithms. Introduction to fundamental data structures, sorting, recursive programs, dynamic data structures, memory management, algorithm design techniques and complexity analysis, and applications in optimization problems. Examples from linear and integer programming, covering, knapsack, graph-theoretic problems, network analysis, and scheduling.

**Topic 5: Business Process Simulation.** Modeling with simulation languages; random number generation; statistical analysis of input and output; variance reduction techniques; computer software applications. Additional prerequisite: Introductory coursework in operations management and statistics.

**Topic 6: Integer Programming.** Mathematical programming models with discrete (integer) decision alternatives. Model formulation and solution algorithms. Additional prerequisite: Coursework in linear programming.

**Topic 7: Nonlinear Programming.** Optimization of nonlinear functions of many variables subject to linear or nonlinear constraints. Basic theory, solution algorithms, applications, computer software. Additional prerequisite: Coursework in advanced calculus and linear algebra.

**Topic 8: Large-Scale System Optimization.** Formulation and solution of large mathematical optimization models. Focus on algorithms that exploit special structure of linear and nonlinear programming models. Applications. Additional prerequisite: Coursework in advanced calculus and linear programming.

**Topic 9: Stochastic Processes.** Discrete stochastic systems, queueing processes, inventory models, replacement, renewal theory, Markovian processes. Additional prerequisite: Mathematics 362K or the equivalent; completion of calculus and mathematical statistics and probability is recommended.

**Topic 10: Queueing Systems.** Deterministic queues, priorities, random walks, networks, approximations, and applications. Additional prerequisite: Operations Management 380 (Topic 9) or the equivalent.

**Topic 11: Graduate Seminars.** Required for doctoral students in operations management.

**Topic 12: Logistics.** Tools and concepts for the management of the flow of information, material, product, and cash between the initial suppliers of raw material and the ultimate consumers of finished goods.

**Topic 13: Management Planning and Control of Complex Systems.** Designed to provide guidance to doctoral students interested in

research on new approaches to management planning and control of complex systems, and to MBA students interested in evaluating new practices currently being used in management planning and control activities.

**Topic 15: Optimization I.** Introduction to operations research and optimization, including linear programming, network models, deterministic dynamic programming, decisions under uncertainty, game theory, inventory models, and simulation. Emphasis on mathematical programming models and algorithmic approach of operations research problems.

**Topic 16: Optimization II.** Designed to provide students, especially those involved in research, with more advanced optimization tools in several broad areas. Includes nonlinear programming, graph theory, integer programming, Markov chains, probabilistic dynamic programming, queueing theory, and metaheuristics. Emphasis on mathematical programming modeling and algorithmic approach of operations research problems. Additional prerequisite: Operations Management 380 (Topic 15).

**Topic 17: Supply Chain Analytics.** Supply chain analytics combines analytical tools with technology to identify trends, compare performance and highlight improvement opportunities in supply chain areas including sourcing, inventory management, manufacturing, quality, sales and logistics. Additional prerequisite: Consent of instructor.

## Professional Courses

### **O M 184, 284, 384. Topics in Business Analytics.**

Restricted to students admitted to the Master of Science in Information, Risk, and Operations Management (MSIROM) program. Selected topics in business analytics. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

### **O M 186, 286, 386. Current Issues in Operations Management.**

Strategic problems, policies, models, and concepts for the design and control of new or existing operations systems. For each semester hour of credit earned, one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

**Topic 1: Service Management.**

**Topic 2: Supply Chain and Operations Strategy.**

**Topic 3: Strategic Quality Management.**

**Topic 4: Operations Practicum.**

**Topic 5: Managing Projects.**

**Topic 6: Decision-Support Modeling.** Operations research and modeling to assist in decision making through building data models and operations research software systems. Management Information Systems 383N (Topic: Decision-Support Modeling) and Operations Management 386 (Topic 6) may not both be counted.

**Topic 7: Data Driven Health Care Operations.** Explore operational challenges arising in outpatient clinics, hospitals, and drug development and production. Examine a combination of business cases and representative data sets. Utilize R as a supporting tool. Operations Management 386 (Topic: Healthcare Analytics) and 386 (Topic 7) may not both be counted.

**Topic 8: Healthcare Analytics.** Restricted to students in the Masters of Science Program. Operations Management 386 (Topic: Healthcare Analytics) and 386 (Topic 8) may not both be counted.

### **O M 392. Seminar: Operations Management.**

Intensive analysis of operations management issues. Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Admission to the doctoral degree program and consent of instructor.

**Topic 1: Operations Management Colloquium.**