Management Science/Operations Management (MSOM)

Course information contained within the Bulletin is accurate at the time of publication in August 2023 but is subject to change. For the most up-to-date course information, please refer to the Course Catalog.

MSOM 3101. Operations Management. 3 Credit Hours.
An examination of the activities necessary for the provision of the organization's product or service. Planning and scheduling of operations, allocation of resources, including staffing requirements and equipment decisions, inventory control and production planning, waiting line problems, and quality.

Field of Study Restrictions: Must be enrolled in one of the following Fields of study: Accounting, Facilities Management, Actuarial Science, Business Management, Construction Engr Tech, Construction Mgt Tech, Economics, Economics, Entrprnrship & Innovation Mgt, Entrepreneurship, Finance, Financial Planning, Human Resource Management, International Business, Industrial + Sys Engineering, Legal Studies, Management Information Systems, Marketing, Real Estate, Risk Management and Insurance, Supply Chain Management, Statistical Sci + Data Analyt, Undeclared-Business & Mngt.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (STAT 2103, STAT 2903, STAT 2104, STAT 2102, STAT 2902, STAT 2512 (may be taken concurrently), AS 2505 (may be taken concurrently), MATH 3031, or ISE 2101)

MSOM 3682. Independent Study. 3 Credit Hours.
Readings and/or papers under supervision of a faculty member.

Repeatability: This course may be repeated for additional credit.

MSOM 3901. Honors Operations Management. 3 Credit Hours.
An examination of the activities necessary for the provision of the organization's product or service. Planning and scheduling of operations, allocation of resources, including staffing requirements and equipment decisions, inventory control and production planning, waiting line problems, and quality. Open only to business designated Honors students (or with special permission). May be used to fulfill the operations management requirement of the Fox School of Business and Management. NOTE: The Honors version of MSOM 3101 (0105).

Cohort Restrictions: Must be enrolled in one of the following Cohorts: SCHONORS, UHONORS, UHONORSTR.

Course Attributes: HO

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of C- in (STAT 2103, STAT 2903, STAT 2104, STAT 2102, STAT 2902, STAT 2512 (may be taken concurrently), AS 2505 (may be taken concurrently), MATH 3031, or ISE 2101)

MSOM 5001. Operations Management. 1 to 3 Credit Hour.
The "operations" function is the core of any organization, where inputs such as labor and technology are converted into goods and services. The course provides a survey of several diverse operations topics that are central to both the manufacturing and service sectors of the economy, such as forecasting, inventory control, quality management, production planning, and supply chain management. The emphasis of the course is to apply quantitative models to effectively design and control these operational systems. Software is extensively used to support the operations analysis.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of B- in (STAT 5001, STAT 5401, or STAT 5301)

MSOM 5107. Lean, Six Sigma, and the Science of Improvement. 3 Credit Hours.
This course provides an outstanding opportunity to learn the basic concepts of improvement science and offers exposure to key tools used in the science and art of improvement. The tools of quality and improvement science are explored, and the student has an opportunity to practice with the tools.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MSOM 5108. Project Management. 3 Credit Hours.
This course follows a life-cycle approach to managing projects, beginning with project initiation concerns and ending with project termination. Project planning and scheduling are given the most emphasis, making use of the PERT and CPM approaches. A course project is required.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MSOM 5111. Optimization Methods. 3 Credit Hours.
This course covers optimization models, methods, and software applied to solve business problems focusing on models and methods used in computational finance, ranging from asset allocation to risk management, from option pricing to model calibration. Students gain an understanding of linear, quadratic, integer, dynamic, and stochastic programming methods and the tools for implementing these models in practice.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MSOM 5156. Logistics and Supply Chain Management: Tools, Strategy, and e-Business Issues. 3 Credit Hours.
One objective of this course is to apprise students of the e-impact on supply chain management (SCM) and, conversely, on how SCM is growing more important as more organizations embrace e-business. The overarching objective, though, is that through this introduction to and survey of the field, students learn what today's issues in logistics and SCM are and how they are treated. That is, the students are expected not only to grasp what typical logistics and SCM problem areas are, but also to become familiar and competent with some of the analysis tools that managers use to address these problems. This course will be taught online.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MSOM 5170. Special Topics. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MSOM 5175. Multi-Criteria Decision Analysis. 3 Credit Hours.
Decision-making processes and techniques emphasize that solving problems often entail conflicting criteria. Approaches to incorporating and resolving this conflict are presented.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MSOM 5182. Independent Study. 1 to 6 Credit Hour.
Special study in a particular aspect of operations research, under direct supervision of a graduate faculty member. No more than six semester hours of independent study may be counted toward degree requirements.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MSOM 5190. Special Topics - MSOM. 1 to 6 Credit Hour.
Content varies by semester.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MSOM 5282. Independent Study. 1 to 3 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MSOM 5806. Managing Operations in the Enterprise. 3 Credit Hours.
This course entails the study of decision-making techniques applicable to operations in both service and manufacturing enterprises. These techniques are examined as they apply to both traditional organizations and those in the dynamic world of new technology and e-business. The techniques are applied in areas such as supply chains, quality management, capacity planning, and resource allocation. Software is used to help students apply these techniques in course projects related to the workplace.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites: Minimum grade of B- in (STAT 5801 or STAT 5001)

MSOM 5882. Independent Study. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MSOM 5890. Special Topics. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MSOM 9101. Continuous and Nonlinear Optimization Methods. 3 Credit Hours.
This course will aim to introduce the basic principles of Continuous Non-Linear Optimization and Optimal Control Theory. Some related Non-Linear Optimization and Optimal Control Theory papers (either existing paper or new idea) will be presented by students after lectures.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MSOM 9102. Linear and Discrete Optimization. 3 Credit Hours.
We will introduce linear programming and integer programming methods in this course. This course will cover how to model large-size problems using linear programming and integer programming and solve them using solvers such as CPLEX. In this course, we will also discuss various research papers with applications of linear programming and integer programming models. This class will also cover the theory and applications of combinatorial optimization. We will introduce graphical and network modeling of problems in transportation and distribution, facility location, communication, scheduling, and staff assignment. Topics include minimum cost spanning trees, the greedy algorithm and matroid theory, network flows, maximal matching, vehicle routing algorithms, computational complexity, total dual integrality, and polyhedral combinatorics.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MSOM 9103. Combinatorial and Discrete Optimization. 3 Credit Hours.
This class will cover the theory and applications of combinatorial optimization. We introduce graphical and network modeling of problems in transportation and distribution, facility location, communication, scheduling, and staff assignment.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MSOM 9104. Stochastic Modeling and Optimization. 3 Credit Hours.
This class will introduce students to the modeling of stochastic, or random, phenomena and the application of these models to problems in operations and supply chain management. Topics include Poisson processes, binomial and exponential distributions, Markov chains and their applications (in particular to queueing theory), as well as Markov renewal theory and continuous-time Markov processes.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MSOM 9105. Fundamentals of Supply Chain and Operations Management Theory. 3 Credit Hours.
This is a course on quantitative models and the analysis and optimization of operations and supply chains. Mathematical models designed to support operational designs in production, inventory, service and supply chain will constitute the core of this course. Topics covered include: (1) deterministic inventory model, (2) stochastic inventory model, (3) supply chain coordination and contracting, (4) model of strategic customers, (5) queueing economics, (6) platform and two sided markets, (7) behavioral decision making, and (8) model of social interaction. The course will also pay particular attention to emerging new methodologies and emerging applications in supply chain, e-commerce, innovative marketplaces and platforms, and sharing economy. This course aims to introduce students to the analytical methods required to conduct analytical research in the above area comprehensively and precisely. It provides essential tools and skills for both future technically oriented business analysis, as well as research in supply chain management.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MSOM 9106. Dynamic Programming: Theory and Its Applications. 3 Credit Hours.
In this course, students will learn how to formulate a sequential decision making problem as a dynamic program. They will learn the classical methods to solve finite-horizon and infinite-horizon dynamic optimization problems. For many dynamic optimization problems whose optimal solutions cannot be easily obtained or practically implemented, we will introduce some useful heuristic approaches, such as value function approximation and model predictive control. For cases when decision makers have incomplete knowledge of the system, students will learn some powerful joint learning and optimizing heuristics, such as upper confidence bound algorithm. We will cover several applications of dynamic programming throughout this course, such as revenue management and pricing, and inventory control. This course aims at preparing students to do research in dynamic programming and its related areas, such as reinforcement learning.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.