

# MANAGEMENT SCIENCE (MGSC)

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## **MGSC 520 - Forecasting and Time Series (3 Credits)**

Time series analysis and forecasting using the multiple regression and Box-Jenkins approaches.

**Prerequisites:** C or better in STAT 516 or MGSC 391.

**Cross-listed course:** STAT 520

## **MGSC 525 - Statistical Quality Control (3 Credits)**

Statistical procedures for process control including CUSUM and Shewhart Control Charts, and lot acceptance sampling.

**Prerequisites:** MGSC 291 or STAT 509 or STAT 515.

**Cross-listed course:** STAT 525

## **MGSC 590 - E-Commerce Concepts and Research Topics (3 Credits)**

Social, technological, commercial, marketing, and political implications of current and impending trends in E-Commerce.

**Prerequisites:** MGSC 390.

## **MGSC 591 - Simulation of Business Systems (3 Credits)**

Theory and design of business simulation experiments, development and use of computer simulation models, and analysis of data generated by computer simulation experiments.

**Prerequisites:** MGSC 291.

## **MGSC 592 - Analysis of Decisions Under Uncertainty (3 Credits)**

Theory and practice of making decisions in an environment of uncertainty; development of skill in the assessment of preferences and probability distributions.

**Prerequisites:** MGSC 291.

## **MGSC 594 - Strategic Management of Information Systems (3 Credits)**

Strategic management and use of information systems in organizations.

**Cross-listed course:** CSCE 594

## **MGSC 596 - Database Management for Business (3 Credits)**

Technology overview and principles of database design for business applications. Enterprise database administration and planning. Design exercises and projects using the latest database management systems software.

## **MGSC 690 - Quantitative Foundations for Business and Economics I (3 Credits)**

Calculus and classical optimization methods applied to problems in business and economic analysis; matrices, derivatives, and integrals in the analysis of both univariate and multivariate business and economic models.

## **MGSC 691 - Quantitative Foundations for Business and Economics II (3 Credits)**

Statistics and probability theory applied to problems of business and economic analysis.

**Prerequisites:** MGSC 690 or ECON 690.

## **MGSC 692 - Quantitative Methods I (3 Credits)**

Probability and statistics necessary for graduate study in economics and business administration; estimation, hypothesis testing, regression, analysis of variance, and nonparametric methods.

## **MGSC 694 - Quantitative Methods II (3 Credits)**

Decision models useful in business and economics; linear programming, sensitivity analysis and duality, network models, integer programming, dynamic programming, inventory and queuing, and simulation.

**Prerequisites:** MGSC 692 or equivalent.

## **MGSC 703 - Computers in Business Administration and Economics (1-3 Credits)**

Introduction to data processing concepts suitable for research interests in business and economics. Topics include research databases, statistical packages, and communication networks.

## **MGSC 711 - Quantitative Methods in Business (3 Credits)**

Quantitative procedures used to make informed business decisions. The course focuses on the application of descriptive statistics, probability, interval estimates, hypothesis testing, and regression to management problems. Restricted to business students.

## **MGSC 771 - Global Sourcing: Strategies and Applications (3 Credits)**

This course covers skills necessary to pursue sourcing and related careers in manufacturing, services, retailing, and government agencies, including discussion of cutting-edge negotiation and sourcing strategies pursued by exemplar firms.

**Prerequisites:** DMSB 718 or MGSC 791.

## **MGSC 772 - Project Management (3 Credits)**

Management of projects including justification, planning, scheduling, monitoring, controlling, and auditing. Makes extensive use of project management information systems.

## **MGSC 774 - Sustainable Operations and Supply Chain (3 Credits)**

This course explores how operations managers can analyze and make decisions regarding the interaction of operations activities on the environment. Students will learn various tools to enable better decision making within the sustainable operations realm.

**Prerequisites:** C or better in MGSC 791 or DMSB 718.

## **MGSC 776 - Supply Chain Modeling (3 Credits)**

Study of the issues, principles, tools and decision processes involved in designing and effectively managing a supply chain. The course entails analyzing and developing models on various topics such as inventory management, transportation, network design and planning, and supply chain coordination.

**Prerequisites:** DMSB 718 or MGSC 791.

## **MGSC 777 - Advanced Quantitative Methods in Business (3 Credits)**

Practical applications of statistical, optimization, heuristic, simulation, and other quantitative techniques for analyzing problems of contemporary business interest in the areas of manufacturing, services, and supply chain management.

**Prerequisites:** C or better in MGSC 711, DMSB 712 or equivalent.

## **MGSC 778 - Revenue Management (3 Credits)**

Concepts of forecasting demand, segmenting customers and allocating capacity or customizing products to distinct customer segments to maximize profits.

## **MGSC 779 - Innovation and Design (3 Credits)**

Creation and launch of viable businesses using innovation tournaments. Development of problem solving and design skills. Application to real innovation and entrepreneurial hurdles.

**MGSC 789 - Business Process Analysis, Design, and Implementation (3 Credits)**

Study of the concepts, tools and issues associated with analyzing and improving modern business processes including quality management, process control, systems and technologies for process support, and case studies.

**Prerequisite or Corequisite:** C or better in DMSB 718 or MGSC 791.

**MGSC 790 - Data Resource Management (3 Credits)**

Overview of data resource management, including database technology and design, information architecture planning, and database administration. A design project is required.

**MGSC 791 - Operations Management (3 Credits)**

Survey of production or operations functions of organizations. Development of concepts and decision processes relevant to major problem areas. Emphasizes relevance of operations management in both manufacturing and service organizations.

**Prerequisites:** C or better in ACCT 726 and MGSC 711.

**MGSC 793 - Simulation Methods in Business Systems (3 Credits)**

Advanced theory and design of business simulation programs and validation and statistical analysis of model output.

**Prerequisites:** MGSC 692, MGSC 694.

**MGSC 794 - Programming Methods (3 Credits)**

Mathematical programming techniques which are useful in business and economics. Topics include: solution techniques and applications of linear programming, duality theory, parametric programming, the decomposition problem, integer programming, dynamic programming, Lagrange multipliers, Kuhn-Tucker theory, and an introduction to control theory.

**Prerequisites:** MGSC 694.

**MGSC 795 - Econometrics and Regression I (3 Credits)**

A treatment of single equation estimating techniques for the simple linear model, various nonlinear models, and the general linear model.

**Prerequisites:** MGSC 882.

**MGSC 796 - Information Systems (3 Credits)**

The study of the integration of functional area and company-wide information components considering both internal and external information flows.

**MGSC 797 - Sampling Techniques (3 Credits)**

Statistical designs and techniques for survey investigations. Mathematical development of sampling systems; sampling units; sample size; estimation; costs; non-sampling problems. Methods of obtaining and reporting information.

**Prerequisites:** MGSC 692 or equivalent.

**MGSC 798 - Introduction to Cybersecurity Management (3 Credits)**

Analysis of concepts, conventions, and assumptions needed to manage cybersecurity policy and strategy development. Covers nomenclature, primary threat vectors, various cybersecurity frameworks, and ethical dimensions of cybersecurity management.

**MGSC 873 - Service Operations Management (3 Credits)**

Analysis of service operations, integrated about strategy, design, and delivery issues. Comparison of manufacturing and service operations, emphasizing consumer participation in the service process.

**Prerequisites:** C or better in DMSB 718 or MGSC 791.

**MGSC 874 - Operations Strategy and Productive Systems Design (3 Credits)**

Development and implementation of productive operations strategy and its relation to the overall organizational strategy; particular attention is given to the interface between product and process technology.

**Prerequisites:** MGSC 791.

**MGSC 875 - Supply Chain Coordination and Control (3 Credits)**

Design and management of systems that coordinate information and material flows within and between firms in a supply chain. Addresses planning basics, system alternatives, and advanced value stream synchronization.

**Prerequisites:** DMSB 718 or MGSC 791.

**MGSC 882 - Advanced Statistics for Business I (3 Credits)**

The development and application of advanced statistical methods to problems in business and economics. Topics include application of estimation and hypothesis testing in both univariate and multivariate cases.

**Cross-listed course:** MGMT 882

**MGSC 889 - Design of Advanced Business Information Structures (3 Credits)**

A study of data structures and file management with specific attention to applied business problems. Special emphasis is placed on the structure and management of information for management decision-making systems.

**Prerequisites:** CSCE 205 and CSCE 500.

**MGSC 890 - Telecommunications (3 Credits)**

Technological concepts and techniques applied in video, data, and voice communications. Topics include local area networks, wide area networks, standards, management, and cost issues involved in telecommunications.

**Prerequisites:** MGSC 796.

**MGSC 892 - Advanced Statistics for Business II (3 Credits)**

The structure and analysis of experimental and research designs with applications to business and economic problems.

**Prerequisites:** MGSC 882/MGMT 882 or equivalent.

**MGSC 894 - Advanced Topics in Management Science (3 Credits)**

Topics will be selected from: nonlinear programming, stochastic programming, integer programming, spectral analysis, decision theory, Markov processes, Box-Jenkins methods, management information systems.

**Prerequisites:** MGSC 694.

**MGSC 895 - Econometrics and Regression II (3 Credits)**

Topics in generalized least squares, autocorrelation, distributed lag models, principle components, identification, and simultaneous estimating techniques.

**Prerequisites:** MGSC 795.

**MGSC 896 - Intelligent Information Systems Design for Business Decision Making (3 Credits)**

Selection, design, and application of a wide range of decision support systems and knowledge-based information technologies for supporting effective managerial decision making.

**MGSC 897 - Global Supply Chain Operations Management: Graduate Capstone Consulting Project (4 Credits)**

This course entails a live project under faculty supervision in which student teams apply GSCOM concepts and techniques to solve practical significant problems and opportunities in real-world service and manufacturing firms.

**Prerequisite or Corequisite:** C or better in MGSC 789 and permission of instructor.

**MGSC 898 - Management of Technology and Innovation (3 Credits)**

The role of product and process innovation in competitiveness, intellectual property rights, organizing the technical effort, and techniques to enhance and pace technology development.

**Prerequisites:** MKTG 751 and MGSC 791.