Management Science (MAS)

MAS 105. Quantitative Methods in Business I. 3 Credit Hours.
This course provides a background in algebra, linear equations, matrices, quadratic, exponential, and logarithmic functions appropriate for the successful understanding, interpretation, and use of these concepts and their application to business and economics within the Business School curriculum and in career endeavors. The course also provides an introduction to the mathematics of finance, interest rates, discounting of future returns, and linear programming.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

MAS 110. Quantitative Applications in Business. 3 Credit Hours.
Review of algebra emphasizing its application to supply and demand functions, market equilibrium, compound interest, and amortization. Differential calculus emphasizing its applications to marginal cost and revenue functions, maximization, taxation in competitive markets, and elasticity of demand are discussed. The application of integral calculus to total cost and profit of demand, to total cost and profit functions, consumer’s and producer’s surplus, computation of present value, and constrained optimization using partial differentiation are also included. Prerequisites: MTH 107 or equivalent or ALEKS score greater than or equal to 76.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 201. Introduction to Business Statistics. 3 Credit Hours.
Data analysis and presentation, cross tabulations, descriptive statistical measures, probability, sampling, statistical inference, hypothesis testing for one and two populations, covariance and correlation analysis. Utilization of microcomputer statistical packages is also included. Prerequisites: MAS 110 or MTH 130 or MTH 141 or MTH 151 or MTH 161 or MTH 171.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 202. Intermediate Business Statistics. 3 Credit Hours.
Chi-squared goodness of fit tests, and contingency tables, analysis of variance, simple linear regression, multiple regression, time series, forecasting, statistical methods of quality. Utilization of microcomputer statistical packages, case analyses, and presentations are also included. Prerequisites: MAS 201 or MAS 311 or MTH 224 or IEN 311 or PSY 204 or PSY 291 or PSY 292.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 311. Applied Probability and Statistics. 3 Credit Hours.
Descriptive statistics, basic probability, probability distributions, distribution theory, point and interval estimation, and single sample hypothesis testing. Prerequisites: MTH 162 or MTH 172. Or Corequisites: MTH 162 or MTH 172 including equivalents.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 312. Statistical Methods and Quality Control. 3 Credit Hours.
Two sample hypothesis testing, simple and multiple regression, analysis of variance, design of experiments, and statistical quality control. Prerequisites: MAS 311 or IEN 311 or equivalent.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 332. Data Acquisition, Preparation and Visualization. 3 Credit Hours.
Prerequisites: MAS 202 or MAS 312.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 342. Introduction to Optimization and Decision Making. 3 Credit Hours.
Introduction to deterministic mathematical models with applications to business problems. Topics include the methodology of operations research, linear, integer, and dynamic programming, project management, networks, multi-objective optimization and heuristics. Software packages are used for programming applications. Lecture, 3 hours. Prerequisites: MTH 162 or MTH 172, MAS 201 or MTH 311.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 432. Data Analysis. 3 Credit Hours.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MAS 442. Stochastic Models in Operations Research. 3 Credit Hours.
Introduction to probabilistic models and their applications. Topics include inventory theory, stochastic processes (queuing systems, Markov chains), and computer simulation. Lecture, 3 hours. Prerequisites: MAS 311 or equivalent.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MAS 452. Systems Analysis Methodology and Applications. 3 Credit Hours.
Introduction to deterministic mathematical models with applications to business problems. Topics include the methodology of operations research, linear, integer, and dynamic programming, project management, networks, multi-objective optimization and heuristics. Software packages are used for programming applications. Lecture, 3 hours. Prerequisites: MTH 162 or MTH 172, MAS 201 or MTH 311.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 499. Directed Study. 1-3 Credit Hours.
Independent investigation of special problems. Offered by special arrangement only. Approval of supervising professor as to topic and evaluation of project required at time of registration.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.
MAS 547. Computer Simulation Systems. 3 Credit Hours.
Introduction to discrete-event computer simulation and hands-on development of simulation models. Topics include introduction to queuing theory, input and output analysis, random number generation, and variance reduction techniques. Students practice their modeling skills using commercial state-of-the-art simulation software. Assigned readings of real-life simulation projects complement the material learned in the classroom. Lecture, 3 hours.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MAS 548. Data Mining and Knowledge Acquisition. 3 Credit Hours.
This course provides an introduction to the principles and techniques of data mining. Topics covered include the data mining process, data preprocessing, data mining techniques and data mining evaluation. The course will involve a combination of lectures, labs, projects and case studies.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MAS 550. Management Science Internship. 1-3 Credit Hours.
Student is individually assigned to operating business firm or other organization to gain insight into management practice in area of career interest. Periodic reports and conferences are required. Permission of department chair is required prior to registration.

Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 555. Management Science Honors Research Project. 3.00 Credit Hours.
Research project to fulfill requirements for Departmental Honors in Management Science.

Components: THI.
Grading: SUS.
Typically Offered: Offered by Announcement Only.

MAS 595. Topics in Management Science. 1-3 Credit Hours.
Topics in selected areas of specialization.

Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 596. Topics in Management Science. 1-3 Credit Hours.
Topics in selected areas of specialization.

Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 610. Statistical Analysis for Managerial Decision Making. 3 Credit Hours.
Data analysis, probability concepts, distributions, sampling, estimation, hypothesis testing, simple and multiple regression and correlation analysis.

Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 611. Principles of Quality Management. 3 Credit Hours.
The definition of quality management, its history, and comparison of various schools of thought. An introduction to the theories of systems, variation, knowledge, and psychology as they relate to quality management. Deming's fourteen points for management are studied through examples and cases.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MAS 612. Advanced Quantitative Analysis. 3 Credit Hours.
The application of probability theory to the formulation and analysis of mathematical models for decision making. Applications are taken from inventory control, forecasting, waiting lines, quality control, production, and operations management.

Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 628. Introduction to Accounting Analytics. 3 Credit Hours.
This course introduces students to applications of data analytics techniques in accounting which includes: financial reporting, managerial accounting, taxation, and auditing.
Prequisite: ACC 301. And ACC 402. And ACC 403.

Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 629. SAS Programming for Business Analytics. 2 Credit Hours.
SAS (Statistical Analysis System) is considered a world leader in business analytics software. This course provides the student with the tools necessary to program in SAS at an intermediate level necessary for data scientists in many Fortune 500 companies in the pharmaceutical, financial, manufacturing and health care industries. The course begins with an introduction to Base SAS software, including the reading, manipulation and transformation of data. Techniques for restructuring data files, merging and concatenating data sets, creating summary reports as well as the utilization of basic statistical procedures will comprise the first half of the course. The middle of the course will focus on intermediate SAS skills for Data Management. The topics include error checking, report generation, date and time processing, PROC SQL, SAS Graph, SAS Macros, and the ODS (Output Delivery System) for production quality output. The last third of the course will include SAS statistical procedures most often utilized by data analysts and covered in the SAS Certified Statistical Business Analyst Credential.

Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 630. Quality Management in Practice. 3 Credit Hours.
This course presents administrative systems necessary for an organization or an individual to pursue quality management. The course presents a functional model for quality management.

Components: LEC.
Grading: GRD.
Typically Offered: Fall.
MAS 631. Statistics for Managerial Decision Making. 2 Credit Hours.
This course aims to familiarize the student with statistical theory, tools, and methods required for business systems analysis and improvement. Topics include descriptive methods, elementary probability, random variables and the distributions, hypothesis testing, confidence intervals, statistical modeling, and regression.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MAS 632. Management Science Models for Decision Making. 2 Credit Hours.
This course aims to familiarize the student with Management Science tools for business systems analysis and improvement. The coverage includes linear and integer programming models, project management, simulation, queuing, and decision analysis. Some widely used software are illustrated through examples and case studies derived from business applications.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MAS 633. Introduction to Quality Management. 2 Credit Hours.
Introduction to the major elements of Dr. Deming's theory of management, including Dr. Deming's System of Profound Knowledge and Fourteen Points for Management. Additionally, participants are introduced to "Six Sigma" tools and methods. These tools and methods have been adopted with great success by many of the largest organizations in the world, for example, General Electric, Allied Signal, Dupont, American Express, and J.P. Morgan. Additionally, the course is a prerequisite for the "Six Sigma" Green Belt certification examination.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MAS 634. Administrative Systems for Quality Management. 2 Credit Hours.
This course presents a model to pursue quality management (QM). It features administrative systems and structures necessary for Quality Management. The administrative systems and structures presented in this course are required to sit for the Six Sigma Management "Green Belt" certification examination.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MAS 635. Design of Experiments. 2 Credit Hours.
This course presents tools and methodology useful in conducting experiments that provide valid answers to questions of interest to the experimenter. The course discusses an overall approach to obtaining and analyzing experimental data, the advantages of using structured multi-factor experiments to screen for important factors, ways of minimizing the amount of data points needed to obtain desired information, and how to identify values of experimental factors that optimize the value of measured responses. Factorial designs, fractional factorial designs, screening designs, and response surface designs are presented. Emphasis is placed on the knowledge required for proper application of these methods through many examples in business and quality management.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MAS 636. Statistical Process Control and Reliability. 2 Credit Hours.
This course aims to introduce some fundamental concepts of statistical process control and reliability with an emphasis on business applications. The first part of the course focuses on control charts and other tools that are used to monitor and improve business processes. The second part of the course introduces some basic ideas of reliability models and presents methods used in identifying failure modes in products and in business systems.
Prerequisite: MAS 631.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MAS 637. Applied Regression Analysis and Forecasting. 2 Credit Hours.
This course aims to familiarize the student with statistical prediction. It covers simple and multiple regression methods as well as time series and forecasting models in business. Instead of theoretical development, the course emphasizes the application of these methods in business systems analysis and improvement.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

MAS 638. Management Science Consulting. 2 Credit Hours.
The purpose of this course is to enhance students' consulting skills in management science. In addition to skills of modeling and choosing appropriate tools for analysis, these include the communication skills of presenting quantitative and analytical material in business settings. The course is structured around a set of case studies that are based on real applications of management science models and methods discussed in MAS 631 and MAS 632.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

MAS 639. Data Acquisition, Preparation And Visualization. 2 Credit Hours.
This course teaches using statistical computing software to get a better understanding of what problems can occur (and what solutions exist) when dealing with a variety of data types and sources. It will also discuss how to address data visualization and how to leverage current methods and software to best communicate with results and decision stakeholders.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 640. Applied Time Series Analysis and Forecasting. 2 Credit Hours.
Time series data occur when a single experimental unit or process is observed repeatedly over time. Data of this type are common in finance and economics. Statistical methods that assume independence are inappropriate for time series data. This course will provide the students with the basic theory and tools for the statistical analysis and interpretation of time series data. Broadly, the methods may be categorized into time-domain and frequency-domain methods. Time-domain methods develop explicit models for the evolution of a process over time. Frequency-domain methods equivalently model the correlation structure of the time series. Other topics include methods for model-based estimation, model selection, diagnostics, forecasting, and computing as they relate to time series analysis.
Prerequisites: MAS 637 or MAS 601.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.
MAS 641. Operations Research Models in Management. 3 Credit Hours.
The application of Operations Research techniques in Management.
Topics include linear programming, PERT/CPM, queuing theory,
forecasting, inventory models, statistical quality control, decision theory,
and Simulation.
Prerequisite: MAS 631, MAS 632, MAS 637, MAS 639 or equivalent.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 646. Generalized Linear Models. 2 Credit Hours.
This is a second course in regression modeling, extending the concept
of linear regression for use with non-normal data such as binary, count,
or time-to-event data. We will discuss estimation, inference, and model
diagnostics with an emphasis on using statistical software to fit models
and interpret the results. Topics covered include logistic regression for
binary data, various extensions of logistic regression to multinomial data,
Poisson regression for count data, and proportional hazards regression
for time-to-event or survival data.
Prerequisite: MAS 601. Or MAS 637. With a Grade B or Higher.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 647. Computer Simulation Systems. 3 Credit Hours.
Introduction to discrete-event computer simulation and hands-on
development of simulation models. Topics include introduction to
queuing theory, input and output analysis, random number generation,
and variance reduction techniques. Students practice their modeling
skills using commercial state-of-the-art simulation software. Assigned
readings of real-life simulation projects complement the material learned
in the classroom. Lecture, 3 hours.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 648. Data Mining. 2 Credit Hours.
Data Mining encompasses finding meaningful and useful trends in data.
The meaningful part depends on the application and even the specific
data set you are using. Another definition that can be used is that data
mining is the application of statistical machine learning techniques to
find these trends. Our focus in this course will be on the development
and use of traditional and cutting edge data mining/machine learning
techniques and their applications across a spectrum of data sets. The
topics we will cover are in supervised learning (regression, classification),
unsupervised learning (clustering, principal components analysis,
factor analysis, etc.), and if time permits semi-supervised learning and
recommendation systems.
Prerequisite: MAS 601. Or MAS 637. With a Grade B or Higher.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 649. Big Data Analytics. 2 Credit Hours.
As firms have the ability to access and store large amounts of customer
and business data, they are faced with the complexities associated with
Big Data. Big Data refers to very large data sets that can be analyzed to
reveal important patterns, trends, and associations, especially relating to
customer behaviors and business processes. This class will discuss the
changes that are needed when handling, visualizing, and analyzing Big
Data to solve business critical questions.
Prerequisite: MAS 601. Or MAS 637. And MAS 639, with a Grade B or
Higher.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 650. Management Science Internship. 1-3 Credit Hours.
Student is individually assigned to operating business firm or other
organization to gain insight into management practice in area of career
interest. Periodic reports and conferences are required. Permission of
department chair is required prior to registration.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 651. Machine Learning for Data Analytics. 2 Credit Hours.
This course aims to introduce recent advanced analytical techniques
developed from the Statistical, Data Mining and Machine Learning
communities. These techniques have become widely used by Business
Analysts and Data Scientists to address complex decision-making
problems in numerous industries. This course is designed to provide
students with a practical understanding of some of the most powerful
Machine Learning methods used by today’s Data Analysts. Specifically,
students will become familiar with supervised and unsupervised learning
and apply these techniques to the numerous data-driven applications in
predictive analytics.
Prerequisite: MAS 648, with a Grade B or Higher.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 663. Project Management and Modeling. 2 Credit Hours.
This course considers the various methods, techniques, and software
tools of project management and modeling with special emphasis on real
estate projects and development. Topics include: project selection and
strategy, risk assessment, conflict and negotiation, budgets, costs, and
resource allocation, monitoring and information systems, project control
and auditing, and project closure. The course is designed to show the
integration of the various roles of owners, developers, builders, architects,
and engineers in the project management process.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

MAS 680. Spatial Statistics. 3 Credit Hours.
Prerequisite: ECO 520.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.
MAS 681. Statistical Machine Learning. 3 Credit Hours.
This course introduces statistical aspects of machine learning algorithms. The focus is on characterizing the generalization ability of machine learning algorithms in order to quantify their performance on new data. It covers fundamental techniques in statistical and computational analysis, their applications in supervised and unsupervised learning algorithms, and their applications in statistical and computational tradeoffs in non-convex optimizations.
Prerequisite: ECO 520. And ECO 620. Or MAS 601. with a Grade B or Higher.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Spring.

MAS 691. Topics in Management Science. 1-3 Credit Hours.
Topics in selected areas of specialization.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 692. Topics in Management Science. 1-3 Credit Hours.
Topics in selected areas of specialization.
Components: LEC.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

MAS 693. Directed Study in Operations Research. 1-3 Credit Hours.
Investigation and research in special areas of interest. Offered by special arrangement.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

MAS 695. Directed Study in Operations Research. 1-3 Credit Hours.
Investigation and research in special areas of interest. Offered by special arrangement.
Components: SEM.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

MAS 696. Directed Study in Statistics. 1-3 Credit Hours.
Investigation and research in special areas of interest. Offered by special arrangement.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

MAS 699. Directed Study. 1-3 Credit Hours.
Offered by special arrangement.
Components: THI.
Grading: GRD.
Typically Offered: Offered by Announcement Only.

MAS 720. Research in Residence. 0 Credit Hours.
Used to establish research in residence for the thesis for the master's degree after the student has enrolled for the permissible cumulative total in MAS 710 (usually six credits). Credit not granted. May be regarded as full-time residence.
Components: LEC.
Grading: GRD.
Typically Offered: Offered by Announcement Only.