

MANAGEMENT SCIENCE (MSD)

Courses and Descriptions

MSD 104 Intro to Quantitative Methods 3 Credits

The aim of this course is to give students the preparation in algebra needed for successful completion of other required courses in management sciences and the functional areas of business administration. Topics covered include linear and quadratic equations and functions, systems of linear equations, exponential functions, logarithms, linear inequalities, radicals, percent change, scientific notation and scientific digits.

MSD 105 Quantitative Methods for Business 3 Credits

The aim of this introductory course is to acquaint students with a number of basic mathematical techniques that will enhance their ability to become effective decision-makers in a realistic business environment. Topics covered include linear equations and inequalities, linear programming, summation notation, geometric series, counting techniques, event probability and discrete random variables. Where appropriate, these tools will be illustrated with examples chosen from business settings.

Prerequisite(s): MSD 104 or a passing grade on the Math Placement Exam.

MSD 106 Quantative Methods for Business II 3 Credits

An introduction to calculus. The limit, derivative, optima and integral of a function of one variable, as well as optimization of a function of two variables, are covered. Applications to problems in business and economics are discussed.

Prerequisite: MSD 105 or equivalent.

MSD 110 Math for Actuarial Science I 3 Credits

The first of two courses designed to give the actuarial science student the necessary background in calculus. Topics include a brief review of a function, and introduces limits and continuity, the derivative and its applications, implicit differentiation, differentiating an inverse function, differentials, related rates, curve sketching, optimization problems, L'Hopital's rule, and an introduction to the indefinite integral. Fall.

MSD 111 Math for Actuarial Science II 3 Credits

A continuation of MSD 110. Topics include the definite integral and the fundamental theorem of calculus, change-of-variable theorems, the area between two graphs, integration by parts, improper integrals, infinite series, partial differentiation of a function of two variables and its optimization applications, and the double integral of a function of two variables.

MSD 205 Business Statistics 3 Credits

This course is designed to provide students with fundamental concepts, knowledge and tools from statistics that may be useful in one's attempt to reach intelligent conclusions in real-world settings, particularly in business applications. The focus is on the normal random variable, sampling distributions, framework of estimation and hypothesis testing, as well as the one-way ANOVA and simple regression model.

Prerequisite(s): MSD 105.

MSD 260 Principles of Risk Management 3 Credits

The objective of this course is to provide students with a broad framework for evaluating all types of risk, along with conceptual tools for making risk management decisions rationally. The course focuses on studying the risk assessment and management techniques, methods, and predictive models used in industry to minimize, control, and communicate risks, including conducting various risk management protocols. This course covers the fundamental knowledge for the Associate in Risk Management (ARM) Designation of Institutes.

Prerequisite(s): CIS 185.

MSD 301 Operations Management 3 Credits

This course introduces students to the concepts and techniques necessary to manage firm operations. The course emphasizes enhancing students' ability in problem-solving and decision-making by (1) identifying operations problems, (2) structuring decision-making process, (3) evaluating options that provide resolution of the problems using appropriate and proven techniques. It is well recognized that today's global business competition is among supply chains. Operations management concentrates on the supply side of the corporate strategy of a supply chain, where the bulk of the organization resources are committed. Good management of operations, which may also be called management of supply chain operations, is crucial in achieving an effective supply chain. The emphasis on systematic thinking and analytic decision model discussed the course will also provide students with necessary skills and useful tools in the emerging field of Business Analytics.

Prerequisite(s): MSD 200 or MSD 205 or MTH 341.

MSD 320 Statistics for Risk Modeling I 3 Credits

This is the first course in a two course sequence to prepare actuarial science students for the Society of Actuaries' (SOA) new exam "Statistics for Risk Modeling." This course (SRM I), together with the second course of the sequence SRM II, cover all the topics in the SOA's proposed syllabus for the exam. The course covers two major topics: (i) Generalized Linear Models, and (ii) Regression-based time series models and forecasting.

Prerequisite(s): MSD 205 or MTH 341.

MSD 325 Statistics for Risk Modeling II 3 Credits

This is the second course in the two course sequence to prepare actuarial science students for the Society of Actuaries (SOA) new exam "Statistics for Risk Modeling." This course, together with MSD 320, will cover all the topics in the SOA's proposed syllabus for the exam. This course examines the use of statistical learning methods to adequately model and understand complex datasets in business and economics. The use of the statistics software R to analyze realistic data sets is an important component of the course. Topics include: (i) Basics of Statistical Learning; (ii) Principal Components Analysis; (iii) Decision Trees; and (iv) Cluster Analysis.

Prerequisite(s): MSD 205 or MTH 341 or equivalent course.

MSD 330 Predictive Modeling and Applications 3 Credits

This course covers a broad range of predictive models in the areas of parametric and non-parametric statistical methods. Examples include time series models and data mining. It focuses on building theoretical foundations underlying these methods and their applications to empirical data such as forecasting time series and classifications. Students are expected to acquire advanced predictive modeling skills and be comfortable with using statistics software R after taking this course. This is a required course for Actuarial Science students in preparation for the Society of Actuaries' "Statistics for Risk Modeling" exam, and an elective course for Business Data Analytics major and minor students who are interested in deepening their skills in predictive analytics.

Prerequisite(s): MSD 205 or MTH 341.

MSD 350 Financial Mathematics 3 Credits

A thorough treatment of the theory and applications of compound interest. Topics include the measurement of interest, elementary and general annuities, amortization schedules and sinking funds, and bonds and other securities.

Prerequisite(s): MSD 205 or equivalent. Fall.

MSD 361 Risk Assessment and Analysis 3 Credits

This course teaches students how to evaluate, and successfully treat risk in different organizations with advanced techniques. Students will learn about risk assessment methodologies, and different tools for risk analysis to avoid, retain, transfer, and benefit from risk. By the end of the course, students will have the skills needed to apply risk assessment and analysis methods in real-world situations. This course provides additional knowledge and hands-on experience for the Associate in Risk Management (ARM) Designation of Institutes.

Prerequisite(s): MSD 260.

MSD 490 Independent Research and Study 3 Credits

Topic to be approved by professor and chairperson. Available for juniors and seniors. No more than 12 credits allowed toward graduation.

MSD 491 Management Sciences Internship 3 Credits

This Internship course will provide students with supervised employment (approximately two months) with participating companies. Students are given a variety of work experiences. They are required to complete a term paper for the faculty and receive feedback from the supervised employment.

Prerequisite(s): Permission of instructor.