

# MANAGEMENT SCIENCE (MS)

## Management Science (MS) Courses

### MS 1023. Business Statistics with Computer Applications I. (3-0) 3 Credit Hours. (TCCN = BUSI 2305)

Prerequisites: A grade of "C-" or better in IS 1403 (or IS 1413) and MAT 1053, or equivalents. This is the first course in a sequence of three courses designed to introduce basic statistical and quantitative techniques for business and economics. This course examines analytical skills and statistical concepts important in business-oriented environments. Various statistical techniques will be presented to assist in solving problems encountered by organizations. Topics include, but are not limited to, descriptive statistics, measures of central tendency and dispersion, elementary probability theory, expected value, random variables, discrete and continuous distributions, sampling distributions, point and interval estimation, and hypothesis testing. Electronic spreadsheets will be utilized for analyzing and interpreting data. Generally offered: Fall, Spring, Summer. Course Fees: BISP \$10; BTSI \$15.41; DL01 \$75; LRB1 \$15.41.

### MS 3003. Visualization in Business Analytics. (3-0) 3 Credit Hours.

This course covers the foundations of data visualization, exploratory data analysis, and data communication via interactive and non-interactive graphical analyses. Students will be able to articulate design principles and best practices for creating meaningful visual displays of data, prepare different types of data for visualization, develop and interpret a wide range of charts and graphs using software (e.g., Tableau), and effectively communicate data-driven business insights using visualizations. This course has Differential Tuition. Course Fee: DL01 \$75.

### MS 3043. Business Statistics with Computer Applications II. (3-0) 3 Credit Hours.

Prerequisites: A grade of "C-" or better in IS 1403 (or IS 1413), MAT 1053, and MS 1023, or equivalents. This course builds on the foundations learned in MS 1023. Statistical concepts include, but are not limited to, hypothesis testing concepts, goodness-of-fit tests, tests of independence, nonparametric tests, decision making under uncertainty, analysis of variance, correlation, linear and multiple regression, and time series. Electronic spreadsheets and statistical software will be utilized in analyzing and interpreting data and for hands-on assessment. Generally offered: Fall, Spring, Summer. This course has Differential Tuition. Course Fee: DL01 \$75.

### MS 3053. Management Science and Operations Technology. (3-0) 3 Credit Hours.

Prerequisites: A grade of "C-" or better in IS 1403 (or IS 1413), MAT 1053, and MS 1023 or equivalents. This is an introductory course in management science that emphasizes model building as a foundation for rational decision making and problem solving across disciplines and functional areas. Topics include, but are not limited to, mathematical programming, network models, project management, multi-criteria decision making, inventory management, service operations and queuing models, Markov analysis, and simulation. Computer software is used to apply these techniques in the analysis of a wide variety of decision problems. Generally offered: Fall, Spring, Summer. This course has Differential Tuition. Course Fee: DL01 \$75.

### MS 3063. Decision Support Systems. (3-0) 3 Credit Hours.

This course focuses on applications of decision-support models and computer software to problems in business, government, and other types of organizations with an emphasis on emerging technologies. It emphasizes fundamentals of decision support systems and hands-on experience using computer-based technologies to support organizational decision making. The primary focus is on four essential areas: decision analysis, simulation, project analysis, and mathematical programming. Excel, Microsoft Project, WINQSB, Expert Choice, and Extend are some of the software packages utilized. This course has Differential Tuition.

### MS 3073. Business Intelligence and Analytics. (3-0) 3 Credit Hours.

Prerequisite: A grade of "C-" or better in MS 3043 or STA 3003 or the equivalent. This course is designed to provide an introduction to business analytics and offer context to introductory statistical models. It also describes and interprets the basic concepts of business analytics, including descriptive, predictive, and prescriptive analytics. Comparisons and contrasts among different business analytics techniques are examined. Students use computer software to conduct their analyses. Generally offered: Fall. This course has Differential Tuition. Course Fee: DL01 \$75.

### MS 3083. Data Management for Business Analytics. (3-0) 3 Credit Hours.

This course introduces essential programming concepts using R, SAS, and SQL to efficiently manipulate and clean data for statistical analyses. Topics include reading raw data, restructuring and combining data files, formatting and recoding variables, and displaying data using tables, charts, and plots. This course has Differential Tuition. Course fee: DL01 \$75.

### MS 3313. Statistical Modeling for Business Analytics. (3-0) 3 Credit Hours.

Prerequisite: A grade of C- or better in MS 3073 and MS 3083, or approval of instructor. This course emphasizes application of statistics in problem-solving situations within business disciplines. Useful techniques include analysis of variance, multiple regression, logistic regression, discriminant analysis, factor analysis, principal component analysis, cluster analysis, multidimensional scaling, and conjoint analysis. Students use computer software (e.g., SPSS, SAS, and/or R) to conduct their analyses. (Formerly titled "Business Applications of Statistics.") Generally offered: Spring. This course has Differential Tuition.

### MS 3403. Logistics Management. (3-0) 3 Credit Hours.

This course focuses on analyzing managerial decisions related to the movement and storage of supplies, work-in-process, and finished goods, examining the trade-offs encountered by managers: costs and service levels, level and modes of transportation used, warehousing and control of inventory levels, demand management and forecasting master production scheduling, just-in-time (JIT), materials requirements planning (MRP), MRP II, DRP, materials handling within warehouses, distribution of finished goods to customers, industrial packaging, and importance of logistics to the overall productivity of a firm are investigated. When available, an integrated software approach such as supply chain management (SCM) and enterprise resource planning (ERP) by SAP, Oracle or I2 will be adopted. Generally offered: Spring. This course has Differential Tuition. Course fee: DL01 \$75.

**MS 3413. Purchasing and Supply Management. (3-0) 3 Credit Hours.**

This course explores the strategic and tactical issues in procurement and supply management. Topics include, but are not limited to, purchasing process, procurement cycle, determination of requirements, supplier qualifications and relationships, appraisals, source selection, contract negotiation and management, commodity planning, buying practices, policies, ethics, and international purchasing. Cost, price, and value analysis in industrial purchasing cycle are also discussed. The course emphasizes a balance of academic and practitioner's perspectives. This course has Differential Tuition.

**MS 4203. Business Analytics Applications. (3-0) 3 Credit Hours.**

Prerequisite: A grade of "C-" or better in MS 4373 or the equivalent, or approval of instructor. This course presents an overview of business analytics applications, including its purpose, benefits and challenges, important analytic processes, and methodologies to perform business analytics in a data driven environment. Students will be introduced to a wide spectrum of relevant business analytics applications encountered in different functional areas. Scope of learning incorporates but not limited to hands-on experience, case-based study, and guest lectures from data analytics experts and managers. This course has Differential Tuition. Course fee: DL01 \$75.

**MS 4213. Analytics for Healthcare Operations Management. (3-0) 3 Credit Hours.**

Prerequisite: A grade of "C-" or better in STA 1053 and IS 1403 or their equivalents. This course provides students with the opportunity to apply analytics and operations management tools across a broad range of healthcare settings: critical, management, and support processes in the medical and public healthcare systems. This course has Differential Tuition. Course Fee: DL01 \$75.

**MS 4313. Six Sigma and Lean Operations. (3-0) 3 Credit Hours.**

This course focuses on Six Sigma as a quality improvement methodology structured to reduce failure rates to a negligible level and on lean operations methodology structured to reduce waste. Materials include an overview of lean management philosophy and fundamentals of DMAIC problem-solving methodology. Topics include project criteria and prioritization methods, process capability measures, scorecard development, Six Sigma tools, DOE, and sampling and analyzing process data. Generally offered: Spring. This course has Differential Tuition. Course Fee: DL01 \$75.

**MS 4323. Analytics with Spreadsheet and Simulation in Business. (3-0) 3 Credit Hours.**

A study of the techniques for modeling and analysis of business processes using computer simulation and animation is the focus of this course. Selected example applications from supply chain management, financial, marketing, and operations functions are included. The computer simulations provide support for the management decision process. This course has Differential Tuition.

**MS 4333. Project Management. (3-0) 3 Credit Hours.**

This course provides a practical examination of how projects are managed from start to finish. The emphasis is on planning and control to avoid common pitfalls and manage risk. Planning includes defining objectives, identifying activities, establishing precedence relationships, making time estimates, determining project completion times, and determining resource requirements. CPM/PERT networks are established, and computer software (Microsoft Project, WINQSB, and Excel) is used to monitor and control the project. Generally offered: Fall. This course has Differential Tuition. Course Fee: DL01 \$75.

**MS 4343. Production/Operations Management. (3-0) 3 Credit Hours.**

This course focuses on the production and operations management function in business. It includes a review of the methods required for design, operation, and improvements of the systems that create products or services. Traditional topics in manufacturing and service operations are investigated including an introduction to supply chain management concepts. Generally offered: Fall. This course has Differential Tuition. Course Fee: DL01 \$75.

**MS 4353. Service Operations Management. (3-0) 3 Credit Hours.**

This course is designed to provide an in-depth examination of operations management practices in service-oriented environments. The subjects introduced include topics from operations management, logistics, marketing, economics, and management demonstrated in a broad spectrum of service organizations. The course looks at strategic concepts in modern service management and presents analytical tools for business decision making. Topics include, but are not limited to, service quality, process design, facility location analysis and site selection, waiting line models, inventory management in services, demand forecasting, workforce scheduling, learning curve models, overbooking, service supply chain, and integrated service operations management. (Same as MKT 4353. Credit cannot be earned for both MS 4353 and MKT 4353.) Generally offered: Fall. This course has Differential Tuition.

**MS 4363. Quality Management and Control. (3-0) 3 Credit Hours.**

This course investigates the fundamental nature of quality and its implications for business. Topics include statistical methods for quality improvement in manufacturing and service operations. Emphasis is given to both the technical and managerial issues in understanding and implementing quality as a component for success in today's global business environment. (Same as STA 4803. Credit cannot be earned for both MS 4363 and STA 4803.) This course has Differential Tuition. Course Fee: BISP \$10; BTSI \$15.41; LRB1 \$15.41.

**MS 4373. Data Mining for Business Analytics. (3-0) 3 Credit Hours.**

Prerequisite: A grade of "C-" or better in MS 3073 and MS 3083, or approval of instructor. This course provides an introduction to machine learning algorithms with applications. Topics include supervised and unsupervised learning methods, resampling methods, model selection, generalized additive model, classification and regression tree methods, k-nearest neighbors, bagging and random forest, support vector machines, social network analysis, and text mining. (Formerly titled "Knowledge Discovery for Business Analytics.") This course has Differential Tuition. Course Fee: DL01 \$75.

**MS 4383. Predictive Operational Analytics. (3-0) 3 Credit Hours.**

This course introduces modern and practical methods for operations planning and decision making. Short-term forecasting of demand, personnel requirements, costs and revenues, raw material needs, and desired inventory levels are some of the topics included. Other topics covered include technological and environmental forecasting, decomposition methods, time series, and monitoring (automatic procedures such as tracking signals). (Formerly titled Applied Forecasting in Operations.) This course has Differential Tuition.

**MS 4543. Supply Chain Management. (3-0) 3 Credit Hours.**

Principles, techniques and practices of corporate supply chain management are covered in this course. The focus is on the strategic coordination and information management that integrates supplier selection, purchasing, transportation, inventory and warehousing, channel planning and configuration, production and distribution from procurement of raw material to customer satisfaction. Business decision models and techniques for facility location, production, inventory, transportation and other operational issues are presented. Currently available software will be surveyed and cases of successful implementations will be analyzed. Generally offered: Spring. This course has Differential Tuition.

**MS 4913. Independent Study in Operations and Supply Chain Management. (0-0) 3 Credit Hours.**

Prerequisites: For business majors: A 3.0 Carlos Alvarez College of Business grade point average, permission in writing from the instructor, the Department Chair, and the Dean of the Carlos Alvarez College of Business (see academic advisor for required forms and additional requirements). Independent reading, research, discussion, and/or writing under the direction of a faculty member. This course may be repeated for credit, but not more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor's degree. This course has Differential Tuition.

**MS 4923. Independent Study in Business Analytics. (0-0) 3 Credit Hours.**

Prerequisite: For business majors: A 3.0 Carlos Alvarez College of Business grade point average, permission in writing from the instructor, the Department Chair, and the Dean of the Carlos Alvarez College of Business (see academic advisor for required forms and additional requirements). Independent reading, research, discussion, and/or writing under the direction of a faculty member. This course may be repeated for credit, but no more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor's degree. This course has Differential Tuition.

**MS 4933. Internship in Operations and Supply Chain Management. (0-0) 3 Credit Hours.**

Prerequisites: A 2.5 grade UTSA point average and approval in writing from the instructor, the Department Chair, and the Associate/Assistant Dean of Undergraduate Studies in the Carlos Alvarez College of Business (see academic advisor for required forms and additional requirements). Supervised full- or part-time work experience in management science. Offers opportunities for applying management science in private businesses or public agencies. A written report is required. May be repeated for credit, but not more than 6 semester credit hours will apply to a bachelor's degree. Generally offered: Summer. This course has Differential Tuition.

**MS 4943. Internship in Business Analytics. (0-0) 3 Credit Hours.**

Prerequisite: A 2.5 UTSA grade point average and approval in writing from the instructor, the Department Chair, and the Associate/Assistant Dean of Undergraduate Studies in the Carlos Alvarez College of Business (see academic advisor for required forms and additional requirements). Supervised full- or part-time work experience in business analytics. Offers opportunities for applying business analytics in private businesses or public agencies. A written report is required. May be repeated for credit, but no more than 6 semester credit hours will apply to a bachelor's degree. Generally offered: Summer. This course has Differential Tuition.

**MS 4953. Special Topics in Operations and Supply Chain Management. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor, Department Chair, and Dean. An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special studies may be repeated for credit when the topics vary. This course has Differential Tuition.

**MS 4963. Special Topics in Business Analytics. (0-0) 3 Credit Hours.**

Prerequisite: MS 3073 and MS 3083 or equivalents. This course explores current and relative topics related to business analytics not covered elsewhere in the Business Analytics program. Special Topics may be repeated for credit when the topics vary, but not more than six semester credit hours will apply towards the support course requirements. This course has Differential Tuition.