DECISION SCIENCES (DNSC)

Explanation of Course Numbers

- Courses in the 1000s are primarily introductory undergraduate courses
- Those in the 2000–4000s are upper-division undergraduate courses that can also be taken for graduate credit with permission and additional work
- Those in the 6000s and 8000s are for master’s, doctoral, and professional-level students
- The 6000s are open to advanced undergraduate students with approval of the instructor and the dean or advising office

DNSC 3401. Introduction to Business Analytics. 3 Credits.
Fundamentals of business analytics: what information it provides, how and when that information is used, and how it affects decision making. Working with uncertainty; understanding the dynamic nature of decision making; using data, regardless of its size; and making decisions with incomplete data. The simulation of real-life scenarios to support optimal decision making.

DNSC 3402. Data Mining. 3 Credits.
Introduction to the practice of exploring and discovering actionable business intelligence from large amounts of data. Data mining concepts, methods, and tools with concrete examples from business applications. Overview of various supervised and unsupervised data mining techniques that can be used both to discover relationships in large data sets and build predictive models. Techniques covered include regression models, decision trees, neural networks, clustering, and association analysis. Prerequisites: STAT 1051 and MATH 1052.

DNSC 4403. Decision Models. 3 Credits.
Students learn to design and develop decision models using spreadsheet software with specialized decision support add-ins, and to effectively interpret the models’ outputs. Commonly used classes of models including, optimization, Monte Carlo simulation and decision analysis. Models discussed span business disciplines including finance, accounting, marketing, human resources, economics, and operations. Prerequisites: DNSC 3401.

DNSC 4900. Special Topics. 0-3 Credits.

DNSC 6201. Intro to Business Analytics. 1.5 Credit.

DNSC 6202. Mathematics and Statistics for Management. 3 Credits.
Mathematical and statistical concepts employed in the solution of managerial problems. Applications of functions, elements of calculus, and linear algebra. Introduction to probability, frequency distributions, statistical inference, and regression and correlation.

DNSC 6203. Statistics for Analytics. 1.5 Credit.
DNSC 6206. Stochastic Fndn: Prob Models. 1.5 Credit.
DNSC 6207. Applied Probability Models. 1.5 Credit.
DNSC 6208. Computational Optimization. 3 Credits.
DNSC 6209. Forecasting for Analytics. 1.5 Credit.
DNSC 6210. Decision and Risk Analytics. 1.5 Credit.
Concepts, methods, and practical tools to analyze managerial decisions involving risk and uncertainty. Decision tree modeling, the strategic value of information, real options valuation, measurement and incorporation of risk preferences, and Monte Carlo simulation. The roles and limitations of judgment and sensitivity and robustness analysis as means to deal with the ambiguities inevitably present in real situations.

DNSC 6211. Programming for Analytics. 3 Credits.
Accessing, preparation, handling, and processing data that differ in variety, volume, and velocity. The ability to handle and process data is a core capability in the context of any analytics position in the industry. Development of a theoretical grounding in emerging paradigms like schema-less data. The programming environments that will be typically employed include Python and R.

DNSC 6212. Optimization Methods and Applications. 3 Credits.
Linear, network, integer, and nonlinear models and their fundamental underlying analytic concepts and solution methods. Emphasis on development of an intuitive understanding of solution methods and their underpinning theoretical paradigms for effective use of optimization models. Model formulation, solutions, and interpretation of results.

DNSC 6216. Business Analytics Skills Workshops. 0-1.5 Credits.
A series of workshops covering project management techniques for analytics projects, team dynamics skills, communicating quantitative information, and ethics, security, and privacy policies in analytics.

DNSC 6217. Business Analytics Practicum. 1.5 Credit.
Working in small teams, students apply their analytics skills to projects sponsored by public or private institutions. Each team is advised by a faculty member, and the practicum sponsor designates a mentor to provide guidance to the team for the duration of the project. Prerequisite: MSBA degree candidacy.

DNSC 6230. Mgt of Technology Innovation. 3 Credits.
DNSC 6234. Procurement & Contracting. 3 Credits.
Principles and concepts essential to effecting large procurement programs. Planning, sourcing, and contractual design for diverse acquisitions. Emphasis on federal government policy with comparison of buying at other governmental levels and the private sector.
DNSC 6247. Organization, Management, and Leadership. 3 Credits.
Fundamentals of human resource management for project managers. Tools and techniques for success in managing and leading people in a project environment.

DNSC 6250. Project Management Finance. 3 Credits.

DNSC 6251. Optimization Models for Decision Making. 1.5 Credit.
Optimization techniques, including linear programming, sensitivity analysis, networks, integer programming and multiple objective optimization, and nonlinear and evolutionary programming. Prerequisites: DNSC 6202 (equivalent to MBAD 6221 and MBAD 6222 or MBAD 6224).

DNSC 6252. Risk Analysis for Decision Making. 1.5 Credit.
Probabilistic modeling techniques, including influence diagrams, utility theory, subjective and empirical probability distribution assessment, simulation models, queuing theory, Markov chains, and game theory. Prerequisites: DNSC 6202 or MBAD 6221, MBA 6222 or MBA 6224.

DNSC 6254. Risk Management. 1.5 Credit.
Basic principles of risk management practices. Developing a risk management plan, including identifying, analyzing, mitigating, and monitoring projects risks. Prerequisites: DNSC 6202 or MBAD 6224 or MBA 6221, MBA 6222.

DNSC 6257. Cost Estimation and Control. 1.5 Credit.
Methods of developing project estimates during the planning stages and updating the estimates throughout the life of the project; monitoring, reporting, controlling, and managing project cost; relationships between project cost and other parameters, including scope, time, quality, reliability and procurement risk. Prerequisites: DNSC 6202 or MBAD 6221, MBA 6222 or MBAD 6224.

DNSC 6258. Executive Decision Making. 1.5 Credit.

DNSC 6259. Project Portfolio Management. 1.5 Credit.
Management of an organization's portfolio of projects for the overall success of the enterprise; alignment of projects with an organization's strategy and goals and consistency with values and culture. Prerequisites: DNSC 6202 or MBAD 6221, MBA 6222 or MBAD 6224.

DNSC 6261. Introduction to Project and Program Management. 3 Credits.
Practical examination of how projects can be managed from start to finish, including specific emphasis on planning and controlling to avoid common pitfalls. Identifying needs, defining requirements, project costing, scheduling, resource allocation, and project politics.

DNSC 6262. Directed Computational Project Management. 3 Credits.
Practical examination of project management concepts by quantitative application using various software tools. Research in real cost data to support project calculations. Prerequisite: DNSC 6254, DNSC 6257, DNSC 6261, DNSC 6267.

DNSC 6263. Managing External Projects. 3 Credits.
Fundamentals of contract management from a project manager's perspective. The outsourcing process, associated project strategies, and legal elements. Acquisition planning, vendor selection, contract formulation, and performance control.

DNSC 6267. Planning and Scheduling. 3 Credits.
Integrated planning, scheduling, and control systems for planning the scope of a project; optimizing time, cost, and resources; and monitoring and controlling schedules, including those for delayed projects. Prerequisites: DNSC 6202 or MBAD 6221, MBA 6222 or MBA 6224.

DNSC 6269. Project Management Application. 3 Credits.
Students will be expected to demonstrate integration of the knowledge accumulated in their study plan and apply integrated knowledge and experience to best practices, a project case history, and a handbook. Prerequisites: M.S.P.M. candidacy or permission of instructor/advisor.

DNSC 6274. Statistical Modeling and Analysis. 3 Credits.
The process of specifying, analyzing, and testing models of human and systemic behavior. Formalization of models; statistical test comparison and selection; computer implementation of univariate, bivariate, and multivariate tests. General linear model: linear regression, analysis of variance, and analysis of covariance. Prerequisite: MBA 6221 and MBA 6222.

DNSC 6275. Advanced Statistical Modeling and Analysis. 3 Credits.
Advanced topics associated with the general linear model. Testing for and remediation of assumption violations. Detection of outliers, influential observations, and multicollinearity. Alternative design strategies in the analysis of variance; latent growth analysis; hierarchical linear modeling; testing for interactions and parallelism. Prerequisite: DNSC 6274 or permission of instructor.

DNSC 6276. Exploratory and Multivariate Data Analysis. 3 Credits.
Methods for exploratory and multivariate data analysis. Application and comparison of advanced multivariate analytical procedures. Multivariate and discriminant analysis, LISREL analysis, and canonical correlation. Prerequisite: DNSC 6274 or permission of instructor.

DNSC 6277. Applied Forecasting and Time-Series Analysis for Managers. 3 Credits.
Introduction to various forecasting techniques, including time-series regression models, cyclical trends, exponential smoothing methods, seasonal and nonseasonal ARIMA processes, and the Box-Jenkins approach. Application of forecasting methods in economics, finance, and marketing. Prerequisite: MBA 6222 or permission of instructor.
DNSC 6279. Data Mining. 3 Credits.
How organizations make better use of the increasing amounts of data they collect and how they convert data into information that is useful for managerial decision making. Examination of several data mining and data analysis methods and tools for exploring and analyzing data sets. State-of-the-art software tools for developing novel applications.

DNSC 6290. Special Topics. 0-3 Credits.
Experimental offering; new course topics and teaching methods. May be repeated once for credit.

DNSC 6298. Directed Readings and Research. 0-3 Credits.

DNSC 6300. Thesis Seminar. 3 Credits.

DNSC 8328. Special Topics in Decision Making. 3 Credits.
Special topics and advanced applications, such as catastrophe theory, Markovian decision processes, and Bayesian statistics. May be repeated once for credit.

DNSC 8385. Special Topics in Research Methods. 3 Credits.
Research problems and issues related to student dissertations form topics for readings, group discussions, and assigned papers.

DNSC 8397. Advanced Special Topics. 1-3 Credits.
Current research and scholarly issues in management science.

DNSC 8998. Advanced Rdgs & Research. 1-12 Credits.
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.

DNSC 8999. Dissertation Research. 1-12 Credits.
Limited to doctoral candidates. May be repeated for credit.