Course Descriptions for the Master of Science in Predictive Analytics Curriculum

MGMT 511 Developing Leadership Competencies
Various personal skills – such as communicating verbally and nonverbally, analyzing, reflecting, strategic thinking, time management, managing information, stress management, career management – contribute significantly to an individual's ability to lead people. Using a variety of tools and techniques, participants in this course will assess and develop their emotional intelligence, capacity to make judgments, and relationship management skills through reflective practice that aligns their theoretical knowledge with their workplace experiences. Emphasis will be placed on problem-solving styles, building global and cultural awareness, ethical decision making, and developing knowledge management skills.

MGMT 513 Leading People in Organizations
Leaders and managers achieve goals working with and through others. They must be skilled in developing individuals to work in teams, in facilitating teams, and in managing conflict. Leaders and managers must understand organizational and national cultures and how they affect the achievement of goals. They must not only hold strong ethical values, but also model them. This course examines the role of managers as leaders in organizations and develops knowledge and skills needed by managers in today's business environment to successfully achieve organizational goals. This course focuses on what leaders are and what leaders do. It is important to know what accounts for effective leadership and how one can become an effective leader. Subsequently, course material will focus upon fundamental principles of leadership and how these principles relate to becoming an effective leader. Emphasis will be placed on self-reflection and analysis in regard to developing one's own leadership skills.

MGMT 553 Big Data Management
This course covers fundamental issues in large-scale data management. The course examines issues related to data organization, representation, access, storage, and processing. Discussion includes open source and commercial solutions, with special attention being paid to large distributed database systems and data warehousing. The course introduces technologies and modeling methods for large-scale, distributed analytics. Prerequisite: MGMT 555 Business Research Methods.

MGMT 555 Business Research Methods
Good business decisions and strategy depend on drawing inferences from data. Today businesses gather and store vast amounts of data on customers, markets, and the business itself. In this course students will learn how to predict and explain phenomena in the environment through the gathering, analyzing, interpreting, and reporting of information that makes business decision makers more effective. The course focuses on methods of conducting business research, including data collection and sampling, measurement, hypothesis testing, basic quantitative analysis, and multivariate statistical techniques. Students will design and execute their own analysis of data in a business discipline of their choice. Excel is used extensively in the course as an analysis tool. Prerequisite: MATH 107 Statistics or ECON 156 Economic and Business Statistics.

MGMT 556 Decision Analysis
This course presents tools for decomposing complex decisions into constituent parts allowing each part to be solved separately and reintegrated into the overall problem solution. Subjecting complex decisions to a formal decision analysis process provides decision makers with much greater clarity about the true nature and risks inherent in the decision being made and produces more precise estimates of the range of
outcomes that each decision option may yield. Decision analysis tools are commonly used to assist decision makers in complex decision environments such as those with multiple quantifiable and non-quantifiable objectives, those that create, eliminate, or change options faced in subsequent decision environments, and decision options whose impacts are shaped by risk and uncertainty in current and future environments. Techniques such as decision trees and probability distributions, influence diagrams, the Simple Multi-Attribute Technique (SMART), Monte Carlo simulations, Bayesian analysis scenario planning, and others will be discussed. Prerequisites: MGMT 152 Principles of Economics and MATH 107 Statistics or ECON 156 Economic and Business Statistics.

MGMT 557 Big Data Analytics
Big Data Analytics is the process of exploring and modeling large data sets to find patterns and gain insights for making actionable knowledge. Students will use MS Excel to explore large data sets from different business areas to support business decision making. This course will introduce students to data mining techniques, and the various problems that can be solved using the techniques. Students will learn to select appropriate analysis methods, use statistical software to apply those methods, and critically evaluate and communicate the results. Prerequisite: MGMT 555 Business Research Methods.

MGMT 577 Project Planning and Management
Introduces project management—the administration of a temporary organization of human and material resources within a permanent organization to achieve a specific objective. You consider both operational and conceptual issues. You learn to deal with planning, implementation, control, and evaluation from an operational perspective. In the conceptual arena, you study matrix organization, project authority, motivation, and morale and explore the differences and similarities between project and hierarchical management. You investigate cases that illustrate problems posed by project management and how they might be resolved.

MGMT 602 Regression, Factorial, and Cluster Analysis
This course is focused on methods concerned with relations among variables and/or significant group differences. Multiple regression will be covered. Other techniques such as principal components analysis (PCA), exploratory factor analysis (EFA), which examines the interrelation between variables, and cluster analysis (CA) and discriminant analysis (DA), which are both concerned with the interrelations between cases or groups will also be covered. Prerequisites: MGMT 555 Business Research Methods and MGMT 557 Big Data Analytics.

MGMT 605 Generalized Linear Models
This course extends linear OLS regression by introducing the concept of Generalized Linear Model (GLM) regression. The course reviews traditional linear regression as a special case of GLM's, and then continues with logistic regression, poisson regression, and survival analysis. The course is heavily weighted towards practical application with large data sets containing missing values and outliers. It addresses issues of data preparation, model development, model validation, and model deployment. Prerequisite: MGMT 602 Regression, Factorial, and Cluster Analysis.

MGMT 608 Advanced Modeling Techniques
Drawing upon previous coursework in predictive analytics, modeling, and data mining, this course provides a review of statistical and mathematical programming and advanced modeling techniques. It explores computer-intensive methods for parameter and error estimation, model selection, and model evaluation. The course focuses upon business applications of statistical graphics and data visualization,
tree-structured classification and regression, neural networks, smoothing methods, hybrid models, multi-way analysis, and hierarchical models. This is a case-study- and project-based course with a strong programming component. Prerequisite: MGMT 605 Generalized Linear Models.

MGMT 612 Marketing Analytics
This course provides a comprehensive review of predictive analytics as it relates to marketing management and business strategy. The course gives students an opportunity to work with data relating to customer demographics, marketing communications, and purchasing behavior. Students perform data cleansing, aggregation, and analysis, exploring alternative segmentation schemes for targeted marketing. They design tools for reporting research results to management, including information about consumer purchasing behavior and the effectiveness of marketing campaigns. Conjoint analysis and choice studies are introduced as tools for consumer preference measurement, product design, and pricing research. The course also reviews methods for product positioning and brand equity assessment. Ethics and legal considerations of marketing analytics are discussed. This is a case-study- and project-based course involving extensive data analysis. Prerequisite: MGMT 605 Generalized Linear Models.

MGMT 615 Web Analytics
A central part of e-commerce and social network applications, the World Wide Web is an important channel and data source for online marketing and customer relationship management. This course provides a comprehensive review of Web analytics, including topics in search marketing, social network marketing, social media analytics, user generated content management and marketing, mobile advertising and commerce, and CRM strategy. The course examines the use of Web sites and information on the Web to understand Internet user behavior and to guide management decision-making, with a particular focus on using Google Analytics. Topics include measurements of end-user visibility, organizational effectiveness, click analytics, log file analysis, and ethical issues in analytics. The course also provides an overview of social network analysis for the Web, including using analytics for Twitter and Facebook. This is a case-study- and project-based course. Prerequisite: MGMT 608 Advanced Modeling Techniques.

MGMT 618 Data Visualization
This course begins with a review of human perception and cognition, drawing upon psychological studies of perceptual accuracy and preferences. The course reviews principles of graphic design, what makes for a good graph, and why some data visualizations effectively present information and others do not. It considers visualization as a component of systems for data science and presents examples of exploratory data analysis, visualizing time, networks, and maps. It reviews methods for static and interactive graphics and introduces tools for building web-browser-based presentations. This is a project-based course with programming assignments. Prerequisite: MGMT 602 Regression, Factorial, and Cluster Analysis.

MGMT 622 Healthcare Analytics
This course focuses on developing skills in analyzing and improving healthcare systems and processes by integrating systems analysis, quality management, operations research techniques, exploratory data analytics and data visualization. Emphasis is placed on the use of organizational data, especially time-stamp data, to study processes and outcomes of care, particularly as it relates to flow analysis and improving work flow. The course relies heavily on hands-on use of computer-based modeling tools. Emphasis will be placed on formulating, designing, and constructing models, drawing conclusions from model results, and translating results into written end-user reports to support process improvement and quality improvement efforts. Prerequisite: MGMT 602 Regression, Factorial, and Cluster Analysis.
MGMT 625 Supply Chain Analytics
This course explores how firms can better organize their operations so that they more effectively align their supply with the demand for their products and services using analytics applied to enhance competitiveness. The course provides both tactical knowledge and high-level insights needed by general managers and supply chain management consultants. The course focuses on managing uncertain demand, both within the firm and across the supply chain. Prerequisite: MGMT 555 Business Research Methods.

MGMT 628 Text Analytics
This course is focused on incorporating text data from a wide range of sources into the predictive analytics process. Topics covered include extracting key concepts from text, organizing extracted information into meaningful categories, linking concepts together, and creating structured data elements from extracted concepts. Students taking the course will be expected to identify an area of interest and to collect text documents relevant to that area from a variety of sources. This material will be used in the fulfillment of course assignments. Prerequisite: MGMT 602 Regression, Factorial, and Cluster Analysis.

MGMT 671 Capstone Project
The capstone course focuses upon the practice of predictive analytics. This course gives students an opportunity to demonstrate their business strategic thinking, communication, and consulting skills. Students work individually on projects that can be work-related or part of a consultative effort with an organization. Students will present their project online to faculty and peers. Prerequisite: Completion of a minimum of 30 credits toward the degree and permission of the instructor.