DECISION SCIENCES (DS)

DS 520   Applied Statistical Modeling   3 Credit Hours
This course explores statistical modeling and analysis techniques for aiding managerial decision making. Topics include: introduction to descriptive statistics, sampling methods and sampling distribution, confidence interval estimation, one sample hypothesis tests, one-way and two-way analysis of variance, simple and multiple linear and nonlinear regressions, and time series forecasting. Selected software packages are used in exercises, projects, and business case examples.
Prerequisite(s): Math Placement with a score of 115 or MATH 104 or MATH 105 or MATH 113 or MATH 115
Restriction(s):
Can enroll if Class is Graduate

DS 570   Prescriptive Business Analytics   3 Credit Hours
The course aims to build a robust understanding of introductory management science, integrating modern applications to tackle current business challenges. It encompasses a variety of topics, such as problem formulation, optimization model development, linear programming, duality theory, economic interpretation, sensitivity analysis, introduction to integer programming, specialized linear programs, network modeling, dynamic programing, game theory, metaheuristics, Markov chains, and Markov decision processes. Emphasis is placed on practical application through hands-on laboratory exercises and semester long optimization projects utilizing selected software packages.
Prerequisite(s): Math Placement with a score of 115 or MATH 104 or MATH 105 or MATH 113 or MATH 115
Restriction(s):
Can enroll if Class is Graduate

DS 630   Applied Forecasting with Python   3 Credit Hours
This course offers a comprehensive examination of diverse quantitative modeling methods employed in forecasting. The curriculum encompasses topics such as moving averages, various smoothing techniques, trend and seasonal forecasting, univariate and multivariate regression-based time series analysis, ARIMA models, judgmental approaches, and the management of forecasting. Python is utilized for hands-on exercises and an applied forecasting project.
Prerequisite(s): (DS 520 or IMSE 510 or IMSE 514 or STAT 530 or STAT 535 or STAT 555 or STAT 560) and (Math Placement with a score of 115 or MATH 104 or MATH 105 or MATH 113 or MATH 115)

DS 631   Decision Analysis and Simulation   3 Credit Hours
This course entails the study of analytic techniques for rational decision-making that address uncertainty, conflicting objectives, and risk attitudes. Topics covered in the course include modeling uncertainty, principles of rational decision-making, representing decision problems with value trees, decision trees, and influence diagrams; solving value hierarchies, decision trees, and influence diagrams; defining and calculating the value of information, incorporating risk attitudes into the analysis, and conducting sensitivity analysis. Students will also learn how to design, model, and implement computer simulation models, including random number generation, applying distribution sampling, and conducting output analysis.
Prerequisite(s): (DS 520 or IMSE 510 or IMSE 514 or STAT 530 or STAT 535 or STAT 555 or STAT 560) and (Math Placement with a score of 115 or MATH 104 or MATH 105 or MATH 113 or MATH 115)
Restriction(s):
Can enroll if Class is Graduate

DS 632   System Simulation   3 Credit Hours
In this course students will learn how to design, model, and implement discrete-event computer simulation models of real or conceptual systems. Simulation studies will be conducted using contemporary software such ProModel. Student will learn random number generation, applying distribution sampling, and conducting output analysis.
Prerequisite(s): (DS 520 or IMSE 510 or IMSE 514 or STAT 530 or STAT 535 or STAT 555 or STAT 560) and (Math Placement with a score of 115 or MATH 104 or MATH 105 or MATH 113 or MATH 115)
Restriction(s):
Can enroll if Class is Graduate

DS 633   Machine Learning for Business Intelligence   3 Credit Hours
This course introduces students to supervised and unsupervised learning techniques applied to business applications. The course builds upon a foundation of conditional probability and linear regression and extends to machine learning techniques including logistic regression, Naïve Bayes, classification and regression trees, random forests, gradient boosting, and neural networks. Performance evaluation is emphasized, and the bias-variance tradeoff and cross validation to avoid overfitting are addressed. Unsupervised learning techniques include clustering and principal component analysis. Other topics may include regularization (e.g., lasso and ridge regression, early stopping), support vector machines, and text mining. Relevant software is used for case studies and projects.
Prerequisite(s): (DS 520 or IMSE 510 or IMSE 514 or STAT 530 or STAT 535 or STAT 555 or STAT 560) and (DS 570 or IMSE 500) and (Math Placement with a score of 115 or MATH 104 or MATH 105 or MATH 113 or MATH 115)
Restriction(s):
Can enroll if Class is Graduate

DS 635   Business Analytics Experience   3 Credit Hours
The purpose of this course is to provide students with an experience that allows them to demonstrate application of integrative knowledge aimed at addressing an industry relevant decision-making problem by drawing on the breadth and depth of the Business Analytics programmatic curriculum. The plan of studies requires that the student complete this course under the direction and guidance of the instructor who may enroll the services of an industry expert for advice. Depending on the size and complexity of the problem, one or many students may be assigned to the project. The deliverables for the course are a detailed project report describing evaluation and analysis of the problem to be presented at a public setting. The course can be finished in one or two semesters.
Prerequisite(s): (DS 520 or IMSE 510 or IMSE 514 or STAT 530 or STAT 535 or STAT 555 or STAT 560) and (DS 570 or IMSE 500) and (BA 530 or DS 630) and DS 633 and DS 631* and (Math Placement with a score of 115 or MATH 104 or MATH 105 or MATH 113 or MATH 115)
Restriction(s):
Can enroll if Class is Graduate
Can enroll if Program is

*An asterisk denotes that a course may be taken concurrently.

Frequency of Offering

The following abbreviations are used to denote the frequency of offering: (F) fall term; (W) winter term; (S) summer term; (F, W) fall and winter terms; (YR) once a year; (AY) alternating years; (OC) offered occasionally