DECISION SCIENCES (DS)

Course Descriptions

DS 300 Quantitative Model and Anlys I 3 Credit Hours
To introduce fundamental concepts and methods in data analysis, probability, estimation, and statistical inference for application in management and management science. Topics include: basic probability theory, discrete and continuous random variables and distributions, sampling and data analysis, sampling distributions, estimation, confidence intervals and hypothesis testing, introductory regression analysis and utilization of statistical software packages.
Prerequisite(s): MATH 104 or MATH 105 or MATH 113 or MATH 115 or Math Placement with a score of 115
Restriction(s):
Can enroll if Class is Sophomore or Junior or Senior

DS 301 Introductory Business Statistics using Excel 3 Credit Hours
Introductory concepts and methods in data analysis and probability, together with their applications to business. Students will be introduced to the use of Excel@ to analyze data and communicate data to a business audience through statistical reports. Topics covered are data generation and categorization; visualizing data; numerical descriptive measures; basic probability; random variables (discrete and continuous); and an introduction to sampling methods and sampling distributions. (F,W,S)
Prerequisite(s): (MATH 104 or MATH 1040 or MATH 100 or MATH 1000 or MATH 105 or MATH 113 or MATH 115 or Math Placement with a score of 115) and (ITM 120 or ISM 120 or MIS 120 or CIS 112 or CIS 123)
Restriction(s):
Cannot enroll if Class is Freshman

DS 302 Advanced Business Statistics 3 Credit Hours
Full Title: Advanced Business Statistics using Excel The continuance of DS301: an introduction to the use of estimation and statistical inference in data analysis using Excel and other appropriate statistical packages, with applications to business. Statistical report writing for a business audience will be emphasized. Topics covered are sampling distributions; confidence interval estimation; hypothesis testing (one-sample tests, two-sample tests, Chi-square test, and analysis of variance); and regression models. (F,W,S)
Prerequisite(s): DS 301

DS 310 Machine Learning for Business 3 Credit Hours
This course introduces students to supervised and unsupervised learning techniques applied to business applications. The course builds upon a foundation of linear regression and extends to machine learning techniques including logistic regression, 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), Naïve Bayes classification, and text mining. Relevant software is used for case studies and projects. (W).
Prerequisite(s): DS 300 or DS 302 or STAT 325 or IMSE 317

DS 425 Prescriptive Analytics 3 Credit Hours
The course aims to establish a strong foundation in introductory management science, integrating up-to-date applications to address contemporary business challenges. It covers a range of topics including problem formulation, optimization model development, linear programming, duality theory, economic interpretation, sensitivity analysis, introduction to integer programming, specialized linear programs, and network modeling. Practical application is emphasized through laboratory exercises and short optimization projects using selected software packages. (YR).
Prerequisite(s): Math Placement with a score of 115 or MATH 104 or MATH 1040 or MATH 100 or MATH 1000 or MATH 105 or MATH 101 or MATH 113 or MATH 115

DS 426 Introduction to Simulation 3 Credit Hours
To introduce the concepts and methods of discrete-event simulation for the modeling and analysis of complex systems. Topics include: basic simulation modeling, modeling complex systems, simulation languages, selection of input probability distributions, random-number generators, generating random variable values, output data analysis for a single system, statistical techniques for comparing alternative systems, validation of simulation models, variance-reduction techniques, experimental design and optimization.
Prerequisite(s): DS 350

DS 430 Business Forecasting with Python 3 Credit Hours
This course explores a diverse range of quantitative modeling methods crucial for forecasting. It includes topics such as moving averages, various smoothing techniques, trend and seasonal forecasting, decomposition approaches, and both univariate and multivariate regression methods. Additionally, it explores the autoregressive integrated moving average (ARIMA) approach. Judgmental forecasting techniques are also covered. Through hands-on laboratory exercises and an applied forecasting project, students actively engage with selected software packages, integrating Python programming for real-world applications (F, W).
Prerequisite(s): DS 302 or STAT 325 or IMSE 317

DS 489 Seminar: Decision Sciences 1 to 3 Credit Hours
To provide students with an opportunity for intensive study in current selected areas related to the research activities and/or professional activities of faculty members. Permission of College of Business.
Restriction(s):
Can enroll if Class is Senior
Can enroll if College is Business

DS 499 Research: Decision Sciences 1 to 3 Credit Hours
To provide the advanced student with the opportunity to undertake a research project under the supervision of a faculty member. At least two weeks prior to registration in the term when such a course is to be elected, an interested student must submit to the dean of the school a written request for permission to elect a research course, on a form available from the school office. The dean will review the proposal with faculty members to ascertain availability of relevant faculty supervision and to establish appropriate credit.
Restriction(s):
Can enroll if Class is Senior

*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