STATISTICS (STAT)

STAT 3000  STATISTICAL METHODS I (3 credits)
Distributions, introduction to measures of central value and dispersion, population and sample, the normal distribution, inference: single population, inference: two populations, introduction to analysis of variance. Statistical packages on the computer will also be utilized in the course. (Cross-listed with STAT 8005)
Prerequisite(s)/Corequisite(s): MATH 1310 or MATH 1220 or equivalent.

STAT 3010  STATISTICAL METHODS II (3 credits)
Regression and correlation, analysis of covariance, chi-square type statistics, more analysis of variance, questions of normality, introduction to non-parametric statistics. Statistical packages are used when appropriate. (Cross-listed with STAT 8015)
Prerequisite(s)/Corequisite(s): STAT 3000 or STAT 8005 or equivalent.

STAT 3800  APPLIED ENGINEERING PROBABILITY AND STATISTICS (3 credits)
An introduction to the application of probability and statistics to engineering problems. Topics include: probability and probability distributions, mathematical expectation, distribution of random variables, binomial, Poisson, hypergeometric, gamma, normal, and t-distributions, Central Limit Theorem, confidence intervals, hypothesis testing, linear regression, contingency tables. Credit for both MATH 4740 and STAT 3800 will not be given. (Cross-listed with STAT 8805)
Prerequisite(s)/Corequisite(s): MATH 1970

STAT 4410  INTRODUCTION TO DATA SCIENCE (3 credits)
Topics covered in this course include Data Technology, Methods of gathering and cleaning structured or unstructured data, Exploratory data analysis & Dynamic and interactive data visualization, Modeling data for prediction, forecasting or classification. (Cross-listed with STAT 8416)
Prerequisite(s)/Corequisite(s): MATH 4740 with at least C- or concurrent or STAT 3800 with at least C- or permission of instructor.
Students enrolling in this course should be comfortable with computer programming & have knowledge of data structures & preliminary statistical methods.

STAT 4420  EXPLORATORY DATA VISUALIZATION AND QUANTIFICATION (3 credits)
Topics covered in this course include Exploratory Data Visualization for categorical/qualitative single/multivariate data, Grammar of Graphics, Organizing Data for Visualization, Methods of Displaying Data that include dynamic and interactive visualization, Visual Diagnostics of Statistical Models and Visual Statistical Inference. Students planning to enroll in this course should be comfortable with computer programming and have knowledge of data structures and preliminary statistical methods. (Cross-listed with STAT 8426)
Prerequisite(s)/Corequisite(s): MATH 4750 or MATH 8756 w/ a grade of C- or better or STAT 3800 or STAT 8005 w/ a C- or better or another introductory probability/statistics course w/ a C- or better, & CSCI 1620 or equivalent with a grade of C- or better, or permission of instructor.

STAT 4430  LINEAR MODELS (3 credits)
This is an introduction to linear statistical models which will include: simple linear regression models, multiple linear regression models, ANOVA models including one way ANOVA, randomized block design, and other designs. Also, logistic regression models, Poisson regression models, bootstrapping/ resampling models, survival analysis. Some necessary linear algebra and mathematical statistics ideas will be covered in the course also. If time allows, some mixed models and/or survival models. Much use of computer software will be made. (Cross-listed with STAT 8436)
Prerequisite(s)/Corequisite(s): MATH 4750 or MATH 8756 w/ a C- or better or STAT 3800 or STAT 8805 w/ a C- or better or instructor permission based on students' having taken a basic statistics course w/ a grade of C- or better & having at least a basic knowledge of calculus.

STAT 4440  TIME SERIES ANALYSIS (3 credits)
The objective of this course is to learn and apply statistical methods for the analysis of data that have been observed over time. Topics covered include: Models for Stationary and Non-Stationary Time Series, Model Specification, Parameter Estimation, Model Diagnostics, Forecasting, Seasonal Models, Time Series Regression, and Spectral Analysis. Statistical software will be used. (Cross-listed with STAT 8446)
Prerequisite(s)/Corequisite(s): MATH 4750 or MATH 8756 w/ a grade of C- or better or STAT 3800 or STAT 8005 w/ a C- or better or another introductory probability/statistics course w/ a C- or better, & CSCI 1620 or equivalent with a grade of C- or better, or permission of instructor.

STAT 4450  INTRODUCTION TO MACHINE LEARNING AND DATA MINING (3 credits)
This is an introduction to machine learning and data mining which covers the following topics with an emphasis on mathematical and statistical analysis: linear and nonlinear regression models, model selection and regularization methods, resampling methods, classification models, tree-based models, and unsupervised learning topics. If time allows, text mining and deep learning will also be introduced in the course. Statistical software will be used. (Cross-listed with MATH 4450, MATH 8456, STAT 8456)
Prerequisite(s)/Corequisite(s): MATH 4740/8746 with a C- or better or STAT 3800/8805 with a C- or better or permission of instructor.