STATISTICS (STAT)

STAT 3379. Statistical Methods in Practice. 3 Hours.
Students study organization and presentation of data; measures of central tendency, dispersion, and position; probability distributions for discrete and continuous random variables, sampling techniques, parameter estimation, and hypothesis testing. Emphasis is given to the use of statistical packages. Also offered as MATH 3379. Course Equivalents: MATH 3379
Prerequisite: Three (3) semester hours of college mathematics.

STAT 3380. Statistical Design and Analysis of Experiments. 3 Hours.
Students study sampling designs and hypothesis testing in analysis of variance, analysis of covariance, and regression analysis. Design characteristics, model diagnostics, and hypothesis testing are emphasized and work is required on real data. The MINITAB and SAS statistics packages are applied. Normally offered in the Spring semester.
Prerequisite: STAT 3379 or MATH 3379.

STAT 3381. Sample Survey Methods. 3 Hours.
Students study the principles needed in planning and conducting sample surveys. Topics may include random, stratified, systematic, and cluster sampling methods as well as sub sampling techniques.
Prerequisite: STAT 3379 or MATH 3379.

STAT 3382. Introduction to Statistical Computing. 3 Hours.
Students examine introductory topics in statistical computing and learn to use various software products related to statistical computing, such as the SAS, SPSS, and R statistical packages. Students also write code to perform calculations.
Prerequisite: STAT 3379.

STAT 3385. Statistical Methods for Data Science. 3 Hours.
Students examine data science methods, techniques, and applications. Topics include data cleansing and manipulation, visualization, and summarization. Additionally, students will explore programming and computing software such as Python and R.
Prerequisite: MATH/STAT 3379.

STAT 3390. Probability and Statistics for Sciences. 3 Hours.
Students study the fundamentals of probability, random variables and their probability distributions, and expected values. Topics include Student t-, F-, and Chi-Square distributions, the confidence interval; hypothesis testing; regression analysis, and ANOVA.
Prerequisite: MATH 1420.

STAT 4090. Independent Study. 1-3 Hours.
This course is designed for advanced students to engage in independent study of an area of interest in statistics under the close guidance of a faculty mentor. Prerequisite: Consent of instructor. Variable credit (1 to 3).
Prerequisite: Consent of instructor.

STAT 4370. Special Topics in Statistics. 3 Hours.
This course is designed to accommodate independent study and research with content determined by mutual agreement of student and supervisor. However, it may also be taught as a special organized class when there is sufficient student interest in a particular project. Such topics as survival analysis, modeling and analysis, categorical data analysis, biostatistics, Monte-Carlo techniques, and bootstrapping may be included. This course may be taken for Academic Distinction credit. (See Academic Distinction Program in this catalog.) May be repeated for credit.
Prerequisite: MATH 3379 or STAT 3379, and consent of instructor.

STAT 4371. Theory and Applications of Probability and Statistics I. 3 Hours.
Students explore basic concepts and properties of probability, random variables, statistical distributions, measures of central tendency, variance, covariance, correlation, functions of random variables, sampling distributions, and the Central Limit Theorem. Also offered as MATH 4371. Normally offered in the Fall semester. Course Equivalents: MATH 4371
Prerequisite: MATH 1430.

STAT 4372. Theory and Applications of Probability and Statistics II. 3 Hours.
Topics include multivariate, conditional and marginal distributions, point and interval estimation, theory of estimation, maximum likelihood estimates, hypothesis testing, likelihood ratio tests, contingency analysis, and nonparametric statistics. Also offered as MATH 4372. Normally offered in the Spring.
Prerequisite: STAT 4371.

STAT 4373. Nonparametric Statistics. 3 Hours.
Students study chi-square goodness-of-fit testing and inferences concerning location and scale. Specific tests include the sign test, Wilcoxon signed-rank test, the Kruskal-Wallis test, tests for randomness and trends, and contingency analyses.
Prerequisite: STAT 3379 or MATH 3379.

STAT 4374. Regression Modeling & Analysis. 3 Hours.
Student study model estimation and testing, model diagnostics, residual analysis, variables selection, and multicollinearity. Work is required on real data with the use of the MINITAB and SAS statistics packages.
Prerequisite: STAT 3379 or MATH 3379.

STAT 4375. Quality Control & Reliability. 3 Hours.
Students examine topics, such as attribute and variables control charts, process capability, acceptance sampling, probabilistic foundations of reliability, hazard functions, failure laws, and system reliability.
Prerequisite: MATH 3379 or STAT 3379.

STAT 4376. Time Series and Forecasting. 3 Hours.
Students examine topics, such as types and classification of time series, methods of forecasting, errors in forecasting, regression analysis for time series, decomposition methods, exponential smoothing, Box-Jenkins methods, nonseasonal and seasonal modeling, and transfer function and intervention models.
Prerequisite: MATH 3379 or STAT 3379.

STAT 4377. Introduction to Applied Bayesian Analysis. 3 Hours.
Students employ statistical methods and their applications using the Bayesian paradigm. Topics may include conditional probability, Bayes' Rule, likelihood ratios, hypothesis testing and credible intervals for population means and population proportions, and simple linear regression using Bayesian estimators. Software such as R, JAGS, WinBugs, and SAS may be used for data analysis.
Prerequisite: MATH 1430.

STAT 4390. Introduction to Statistical Learning. 3 Hours.
Students apply the tools needed for modeling and understanding complex data sets. Topics may include regression, logistic regression, Ridge Regression, Lasso Regression, classification and regression techniques, decision trees, and model selection techniques.
Prerequisite: STAT 3379.