

## Statistics (962)

**201 Introduction to Statistics (3)** Data collection and descriptive statistics. Concepts of probability and probability distributions. Binomial and normal distributions. Estimation of means, confidence intervals, and hypothesis tests for single mean and proportion. Simple regression and correlation. Contingency tables. Process improvement and statistical process control. Use of statistical computing software. Applied course appropriate for a general audience. **(QR)**

*(RE) Prerequisite(s): Mathematics 125 or Mathematics 141.*

**207 Honors: Introduction to Statistics (3)** Intended as an alternative to 201 for higher GPA students. **(QR)**

*Contact Hour Distribution: Two 50-minute lectures and one 110-minute lab per week.*

*(RE) Prerequisite(s): Mathematics 125 or Mathematics 141.*

*Recommended Background: 28 composite ACT or 1250 composite SAT.*

**251 Probability and Statistics for Scientists and Engineers (3)** Data collection and descriptive statistics. Concepts of probability and probability distributions. Discrete and continuous distributions. Estimation of means, confidence intervals, and hypothesis tests for single mean and proportion. Simple regression and correlation. Process improvement, statistical process control, and 2-level experiments. Use of statistical computing software.

*(RE) Prerequisite(s): Mathematics 142 or Mathematics 148.*

**320 Regression and Correlation Methods (3)** Simple linear regression and correlation analysis, time series analysis, multiple regression, variable selection, regression diagnostics, partial correlation, and categorical data analysis techniques. Use of statistical computing software. Applied course appropriate for a general audience.

*(RE) Prerequisite(s): 201 or 251.*

**330 Experimental Methods (3)** Strategies of experimentation: randomization, blocking, sequential experimentation, replication. Design and analysis of experiments to collect nominal data (paired comparison, triangle tests), ordinal data (rating and ranking experiments) and numerical data (single and multiple factor experiments, fractional factorials). Use of statistical computing software. Applied course for a general audience.

*(RE) Prerequisite(s): 201 or 251.*

**365 Statistical Process Control (3)** Concept of special versus common causes of variation. Construction and interpretation of control charts for attributes and variables data, Pareto charts, cause/effect diagrams, and process flow diagrams. Rational subgrouping issues. Process capability analysis and capability indices. Statistical tolerancing. Accuracy, precision and resolution of measurement processes. Quantifying components of variation. Introduction to design of experiments. Discussion of enumerative versus analytical statistical techniques.

*(RE) Prerequisite(s): 201 or 251.*

**471 Statistical Methods (3)** Numeric and graphic description of data, probability and probability distributions, simulation, and sampling distributions. Estimation and hypothesis testing for one and two samples, parametric and nonparametric approaches, and bootstrapping. Tests for count data, simple and multiple linear regression, diagnostics and validation, and analysis of variance. Uses SAS and other statistical software.  
*(RE) Prerequisite(s): 320.*

**472 Regression Analysis (3)** Linear regression and correlation, multiple regression, polynomial regression, selection of variables, use of dummy variables, and analysis of residuals. Logistic regression and its applications. Matrix formulation of model. Use of standard computer packages. Major writing requirement.  
*(RE) Prerequisite(s): 320.*

**473 Experimental Design Analysis (3)** Design and analysis of single factor and many-factor studies. Residual analysis and checking assumptions. Transformations. Sample size determination and power analysis. Analysis of variance for complex experiments. Fractional factorial and incomplete block designs. Use of standard computing packages. Major writing requirement.  
*(RE) Prerequisite(s): 330.*

**474 Introduction to Data Mining (3)** Understanding and application of data mining methods. Data preparation, exploratory data analysis and visualization, cluster analysis, logistic regression, decision trees, neural networks, association rules, model assessment, and other topics. Applications to real world data. Use of standard computer packages.  
*(RE) Prerequisite(s): 471.*

**475 Time Series Analysis (3)** Model building techniques for linear time series models, practical methods for univariate time series forecasting, Box-Jenkins forecasting methods, forecasting based on exponential smoothing, autoregression and stepwise autoregression, and forecasting from regression models. Use of standard computing packages. Major writing requirement.  
*(RE) Prerequisite(s): 320.*

**483 Special Topics in Statistics (1-3)** Topics vary.  
*Repeatability: May be repeated. Maximum 6 hours.*  
*Registration Permission: Consent of instructor.*

**485 Principles of Statistical Process Management (3)** Control charts and other statistical techniques applied to management of business processes.  
*Registration Permission: Consent of department head.*

**492 Internship (1-6)** Supervised off-campus experience in application of statistical principles and methods in business, industry, or government, culminating in a written and oral report.

*Grading Restriction: Satisfactory/No Credit grading only.*

*Repeatability: May be repeated. Maximum 6 hours.*

*Registration Permission: Consent of department head.*

**493 Independent Study (2-6)** Faculty directed reading and investigation of specified topic in probability or statistics culminating in a written report.

*Repeatability: May be repeated. Maximum 6 hours.*

*Registration Permission: Consent of department head.*