STATISTICS

Courses

STAT 2013 Elementary Statistics (A)
Prerequisites: MATH 1483 or higher, except MATH 1493, with a grade of "C" or better; or an acceptable placement score (see mathplacement.okstate.edu).
Description: An introductory course in the theory and methods of statistics. Descriptive measures, elementary probability, sampling, estimation, hypothesis testing, correlation and regression. Same course as STAT 2023 or STAT 2053.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 2023 Elementary Statistics for Business and Economics (A)
Prerequisites: MATH 1483 or higher, except MATH 1493, with a grade of "C" or better; or an acceptable placement score (see mathplacement.okstate.edu).
Description: Basic statistics course for undergraduate business majors. Descriptive statistics, basic probability, discrete and continuous distributions, point and interval estimation, hypothesis testing, correlation and simple linear regression. Same course as STAT 2013 or STAT 2053.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 2053 Elementary Statistics for the Social Sciences (A)
Prerequisites: MATH 1483 or higher, except MATH 1493, with a grade of "C" or better; or an acceptable placement score (see mathplacement.okstate.edu).
Description: An introductory course in the theory and methods of statistics. Descriptive measures, elementary probability, sampling, estimation, hypothesis testing, correlation and regression. Same course as STAT 2013 or STAT 2023.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 2331 SAS Programming
Prerequisites: A different programming language or consent of instructor.
Description: SAS as a general purpose programming language, data representation, input/output, use of built-in procedures, report generation. Course previously offered as CS 2331.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics

STAT 2890 Honors Experience in Statistics
Prerequisites: Honors Program participation and concurrent enrollment in a designated STAT course.
Description: A supplemental Honors experience in statistics to partner concurrently with designated statistics courses. This course adds a different intellectual dimension to the designated courses. Offered for fixed credit, 1 credit hour, maximum of 6 credit hours.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Honors Credit

STAT 3013 Intermediate Statistical Analysis
Prerequisites: STAT 2013, STAT 2023 or STAT 2053.
Description: Applications of elementary statistics, introductory experimental design, introduction to the analysis of variance, simple and multiple linear regression, nonparametric statistics, survey sampling and time series. Data analysis using Excel included.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics

STAT 3023 Statistical Reasoning for Medical Applications (A)
Prerequisites: MATH 1483 or MATH 1513 or higher on an acceptable math placement score. See mathplacement.okstate.edu.
Description: This course focuses on developing the quantitative skills necessary for success in medical school and related activities. Topics include study design, descriptive measures, graphical representations, basic probability, statistical inference, correlation and regression, contingency tables.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 3053 Advanced Statistical Analysis
Prerequisites: STAT 2013, STAT 2023 or STAT 2053.
Description: Methods of estimation, tests of significance, linear regression and correlation, analysis of variance for data that are in a one way, a two-way crossed, or in a two-fold nested classification. Same course as STAT 4035.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 4013 Statistical Methods I (A)
Prerequisites: MATH 1513 or higher, with a grade of "C" or better; or an acceptable placement score (see mathplacement.okstate.edu).
Description: Basic experimental statistics, basic probability distributions, methods of estimation, tests of significance, linear regression and correlation, analysis of variance for data that are in a one way, a two-way crossed, or in a two-fold nested classification. Same course as STAT 4053.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 4035 Advanced Statistical Analysis
Prerequisites: STAT 2013, STAT 2023 or STAT 2053.
Description: Methods of estimation, tests of significance, linear regression and correlation, analysis of variance for data that are in a one way, a two-way crossed, or in a two-fold nested classification. Same course as STAT 4053.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 4053 Advanced Statistical Analysis
Prerequisites: STAT 2013, STAT 2023 or STAT 2053.
Description: Methods of estimation, tests of significance, linear regression and correlation, analysis of variance for data that are in a one way, a two-way crossed, or in a two-fold nested classification. Same course as STAT 4053.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 4183 Nonparametric Statistical Methods (A)
Prerequisites: STAT 2013, STAT 2023 or STAT 2053.
Description: Nonparametric statistical methods that involve the analysis of data that are not amenable to analysis by parametric methods. Includes measures of location and spread, some tests of goodness of fit and independence, and tests of location and scale.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 4213 Applied Statistical Methods (A)
Prerequisites: STAT 2013, STAT 2023 or STAT 2053.
Description: Introduction to the methods of applied regression analysis. Topics include multiple regression, correlation analysis, and some models for the analysis of categorical data. Emphasis is placed on practical application of statistical techniques. A computing tool is used extensively.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 4303 Data Analysis (A)
Prerequisites: STAT 2013, STAT 2023 or STAT 2053.
Description: Introduction to the methods of data analysis. Topics include regression analysis, analysis of variance, contingency table analysis, and exploratory data analysis. Emphasis is placed on practical application of statistical techniques. A computing tool is used extensively.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 4403 Advanced Data Analysis and Modeling (A)
Prerequisites: STAT 2013, STAT 2023 or STAT 2053.
Description: Advanced methods for the analysis of data. Topics include advanced regression analysis, analysis of variance, and some models for the analysis of categorical data. Emphasis is placed on practical application of statistical techniques. A computing tool is used extensively.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Analytical & Quant Thought

STAT 4953 Independent Study (A)
Prerequisites: Honors Program participation and concurrent enrollment in a designated STAT course.
Description: Independent study in statistics. Offered for fixed credit, 1 credit hour, maximum of 6 credit hours.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Statistics
General Education and other Course Attributes: Honors Credit
STAT 4023 Statistical Methods II  
**Prerequisites:** STAT 3013 or STAT 4013 or STAT 4033 or STAT 4053.  
**Description:** Basic concepts of experimental design. Analysis of variance, covariance, split-plot design. Factorial arrangements of treatments, multiple regression in estimation and curvilinear regression, enumeration data. May not be used for degree credit with STAT 4063 or STAT 5563.  
**Credit hours:** 3  
**Contact hours:** Lecture: 3 Contact: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Statistics

STAT 4033 Engineering Statistics  
**Prerequisites:** MATH 2133 or MATH 2163.  
**Description:** Probability, random variables, probability distributions, estimation, confidence intervals, hypothesis testing, linear regression. No degree credit for students with credit in STAT 4073.  
**Credit hours:** 3  
**Contact hours:** Lecture: 3 Contact: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Statistics

STAT 4043 Applied Regression Analysis  
**Prerequisites:** One of STAT 4013, STAT 4033, STAT 4053, STAT 5013 or equivalent.  
**Description:** Matrix algebra, simple linear regression, residual analysis techniques, multiple regression, dummy variables, interactions, model building, introduction to logistic regression. This course explains fundamentals of linear regression and provides an introduction to logistic regression. May not be used for degree credit with STAT 5543.  
**Credit hours:** 3  
**Contact hours:** Lecture: 3 Contact: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Statistics

STAT 4053 Statistical Methods I for the Social Sciences (A)  
**Prerequisites:** MATH 1513 or higher, with a grade of "C" or better; or an acceptable placement score (see mathplacement.okstate.edu).  
**Description:** Basic experimental statistics, basic probability distributions, methods of estimation, tests of significance, linear regression, calculation and analysis of variance for one and two-way classifications. Same course as STAT 4013.  
**Credit hours:** 3  
**Contact hours:** Lecture: 3 Contact: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Statistics

**General Education and other Course Attributes:** Analytical & Quant Thought

STAT 4063 Statistical Methods II for the Social Sciences  
**Prerequisites:** STAT 3013 or STAT 4013 or STAT 4033 or STAT 4053.  
**Description:** Basic concepts of experimental design. Analysis of variance, covariance, split-plot design. Factorial arrangements of treatments, multiple and curvilinear regression, enumeration data. May not be used for degree credit with STAT 4023 and STAT 5563.  
**Credit hours:** 3  
**Contact hours:** Lecture: 3 Contact: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Statistics

STAT 4073 Engineering Statistics with Design of Experiments  
**Prerequisites:** MATH 2163.  
**Description:** Random variables and basic probability distributions, estimation, confidence intervals, hypothesis testing, basic analysis of variance, factorial arrangement of treatments and fractional factorial experiments, elementary quality control. No degree credit for students with credit in STAT 4033.  
**Credit hours:** 3  
**Contact hours:** Lecture: 3 Contact: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Statistics

STAT 4091 Sas Programming  
**Prerequisites:** STAT 4013 or equivalent.  
**Description:** SAS dataset construction, elementary statistical analysis, and use of statistics and graphics procedures available in SAS. No credit for students with credit in STAT 5091.  
**Credit hours:** 1  
**Contact hours:** Lecture: 1 Contact: 1  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Statistics

STAT 4191 R Programming  
**Prerequisites:** STAT 4013 or equivalent.  
**Description:** R dataset construction, elementary statistical analysis, and use of statistics and graphics procedures available in R. May not be used for degree credit with STAT 4193, STAT 5191, STAT 5193.  
**Credit hours:** 1  
**Contact hours:** Lecture: 1 Contact: 1  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Statistics

STAT 4193 SAS and R Programming  
**Prerequisites:** STAT 4013 or equivalent.  
**Description:** SAS dataset construction, elementary statistical analysis, and use of statistics and graphics procedures available in SAS and R. May not be used for degree credit with STAT 4091, STAT 4191, STAT 5091, STAT 5191, STAT 5193.  
**Credit hours:** 1  
**Contact hours:** Lecture: 3 Contact: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Statistics

STAT 4203 Mathematical Statistics I  
**Prerequisites:** MATH 2163 with a grade of "C" or better.  
**Description:** Probability, random variables such as Poisson, Geometric, Hypergeometric, Uniform, Normal, Gamma, Beta, Exponential and their distributions, independence and correlation, multivariate distributions, marginal and conditional probabilities, functions of random variables, order statistics and their distributions, moment generating functions, the Central Limit Theorem. May not be used for degree credit with STAT 5253.  
**Credit hours:** 3  
**Contact hours:** Lecture: 3 Contact: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Statistics
STAT 4213 Mathematical Statistics II  
Prerequisites: STAT 4203.  
Description: Methods of estimating population parameters such as point and confidence interval estimation for a mean, proportion, and the difference between means and proportions, maximum likelihood methods, method of moments, hypothesis testing and its applications, sample size estimation, linear regression models, and categorical data analysis. May not be used for degree credit with STAT 5263.  
Credit hours: 3  
Contact hours: Lecture: 3 Contact: 3  
Levels: Undergraduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 4463 Statistical Machine Learning with R  
Prerequisites: STAT 4043.  
Description: Computationally intense statistical methods for prediction and classification with R. Topics are bias-variance tradeoff; prediction and classification error; cross validation; bootstrapping; linear and logistic regression; discriminant functions; k-nearest neighbors; local and spline-based regression; generalized additive models; model selection and regularization; support vector machines; decision trees; principle component analysis; cluster analysis. May not be used for degree credit with STAT 5063.  
Credit hours: 3  
Contact hours: Lecture: 3 Contact: 3  
Levels: Undergraduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 4981 Statistics Capstone I  
Prerequisites: STAT 4023, STAT 4043, STAT 4091 or STAT 4193; and STAT 4203 or concurrent enrollment.  
Description: Information and preparation for graduate school for statistics undergraduates, communication skills for collaborating with scientists, introduction to research in statistics.  
Credit hours: 1  
Contact hours: Lecture: 1 Contact: 1  
Levels: Undergraduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 4980 Internship in Statistics  
Prerequisites: Consent of instructor.  
Description: Directed practicum or internship experience in a Statistics-related professional work setting. Students must have an approved internship that will provide statistical experience beyond that available in the classroom. Students produce written analyses of their work and learning under the guidance of the instructor and internship site supervisor. Offered for variable credit, 1-12 credit hours, maximum of 12 credit hours.  
Credit hours: 1-12  
Contact hours: Contact: 1-12 Other: 1-12  
Levels: Undergraduate  
Schedule types: Independent Study  
Department/School: Statistics

STAT 4993 Senior Honors Project  
Prerequisites: Departmental invitation, senior standing, Honors Program participation.  
Description: A guided reading and research program ending with an honors project under the direction of a faculty member, with a second faculty reader and an oral examination. Required for graduation with departmental honors in statistics.  
Credit hours: 3  
Contact hours: Contact: 3 Other: 3  
Levels: Undergraduate  
Schedule types: Independent Study  
Department/School: Statistics

STAT 4991 Statistics Capstone II  
Prerequisites: STAT 4023 and STAT 4043 and STAT 4091 or STAT 4193; and STAT 4203 or concurrent enrollment.  
Description: Career skills for statistics undergraduates entering the workforce, communication skills for collaborating with scientists.  
Credit hours: 1  
Contact hours: Lecture: 1 Contact: 1  
Levels: Undergraduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 5000 Master's Research  
Prerequisites: Consent of advisory committee.  
Description: Methods of research and supervised thesis or report. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.  
Credit hours: 1-6  
Contact hours: Contact: 1-6 Other: 1-6  
Levels: Graduate  
Schedule types: Independent Study  
Department/School: Statistics

STAT 5002 Applied Masters Creative Component  
Prerequisites: Consent of advisory committee.  
Description: Creative component for Applied Masters in Statistics.  
Credit hours: 2  
Contact hours: Contact: 2 Other: 2  
Levels: Graduate  
Schedule types: Independent Study  
Department/School: Statistics
STAT 5003 Statistics for Medical Residents  
Prerequisites: Employed as a medical or veterinary resident or permission of instructor.  
Description: Survey of statistical methodology relevant to health care professionals. Basic understanding of statistics presented in recent medical literature. Hypothesis testing, ANOVA techniques, regression, categorical techniques. Same course as BIOM 5003.  
Credit hours: 3  
Contact hours: Lecture: 3 Contact: 3  
Levels: Graduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 5013 Statistics for Experimenters I  
Prerequisites: Graduate standing and MATH 1513.  
Description: Introductory statistics course for graduate students. Descriptive statistics, basic probability, estimation, hypothesis testing, p-values, analysis of variance, multiple comparisons, correlation and linear regression, categorical data analysis.  
Credit hours: 3  
Contact hours: Lecture: 3 Contact: 3  
Levels: Graduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 5023 Statistics for Experimenters II  
Prerequisites: Graduate standing and STAT 4023 or STAT 5013.  
Description: Analysis of variance, contrasts and multiple comparisons, factorial experiments, variance components and their estimation, completely randomized, randomized block and Latin square designs, split plot experiments.  
Credit hours: 3  
Contact hours: Lecture: 3 Contact: 3  
Levels: Graduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 5033 Nonparametric Methods  
Prerequisites: One of STAT 4023, STAT 4043, STAT 5023 or consent of instructor.  
Description: A continuation of STAT 4013 and STAT 4023, concentration on nonparametric methods. Alternatives to normal-theory statistical methods; analysis of categorical and ordinal data, methods based on rank transforms, measures of association, goodness of fit tests, order statistics.  
Credit hours: 3  
Contact hours: Lecture: 3 Contact: 3  
Levels: Graduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 5043 Sample Survey Designs  
Prerequisites: One of STAT 4013, STAT 4033, STAT 5013 or consent of instructor.  
Description: Constructing and analyzing personal, telephone and mail surveys. Descriptive surveys including simple random, stratified random designs. Questionnaire design, frame construction, non-sampling errors, use of random number tables, sample size estimation and other topics related to practical conduct of surveys.  
Credit hours: 3  
Contact hours: Lecture: 3 Contact: 3  
Levels: Graduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 5053 Time Series Analysis  
Prerequisites: STAT 4043.  
Description: An applied approach to the analysis of time series in the time domain. Trends, autocorrelation, random walk, seasonality, stationarity, autoregressive integrated moving average (ARIMA) processes, Box-Jenkins method, forecasting.  
Credit hours: 3  
Contact hours: Lecture: 3 Contact: 3  
Levels: Graduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 5063 Statistical Machine Learning with R  
Prerequisites: STAT 5563.  
Description: Computationally intense statistical methods for prediction and classification with R. Topics are bias-variance tradeoff; prediction and classification error; cross validation; bootstrapping; linear and logistic regression; discriminant functions; k-nearest neighbors; local and spline-based regression; generalized additive models; model selection and regularization; support vector machines; decision trees; principle component analysis; cluster analysis. May not be used for degree credit with STAT 4463.  
Credit hours: 3  
Contact hours: Lecture: 3 Contact: 3  
Levels: Graduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 5073 Categorical Data Analysis  
Prerequisites: STAT 5223, STAT 5023 or equivalent or concurrent enrollment.  
Description: Analysis of data involving variables of a categorical nature. Independence/association test for contingency tables, exact tests for small counts, generalized linear models, logistic regression models for binary response variables, loglinear models for count data, analyses of ordinal variables, multicategory logit models for multiple category responses, and applications.  
Credit hours: 3  
Contact hours: Lecture: 3 Contact: 3  
Levels: Graduate  
Schedule types: Lecture  
Department/School: Statistics

STAT 5083 Statistics for Biomedical Researchers  
Prerequisites: STAT 5013.  
Description: Analysis of variance, experimental designs pertaining to medical research, regression and data modeling, categorical techniques and the evaluation of diagnostic tests. No credit for students with credit in STAT 5023.  
Credit hours: 3  
Contact hours: Lecture: 3 Contact: 3  
Levels: Graduate  
Schedule types: Lecture  
Department/School: Statistics
**STAT 5091 Sas Programming**

**Prerequisites:** STAT 5013 or equivalent.

**Description:** SAS dataset construction, elementary statistical analysis, and use of statistics and graphics procedures available in SAS. No credit for students with credit in STAT 4091.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Statistics

**STAT 5093 Statistical Computing**

**Prerequisites:** STAT 5223.

**Description:** Random variable generation; numerical calculations of maximum likelihood estimators, computer intensive exact tests; randomized tests; bootstrap and cross validation methods, Monte Carlo integration and simulation; Markov Chain Monte Carlo methods for Bayesian estimation.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Statistics

**STAT 5123 Probability Theory**

**Prerequisites:** MATH 2163 and one other course in MATH that has either MATH 2144 or MATH 2153 as a prerequisite.

**Description:** Basic probability, including conditional, marginal, and joint distributions. Random variables, moments, independences and dependence, common distributions, and distributions of functions of random variables. Course explains probability calculations, the usefulness of probability, and the fundamentals required for obtaining sampling distributions. Useful in preparing for the actuarial P exam.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Statistics

**STAT 5133 Stochastic Processes**

**Prerequisites:** STAT 5123 and MATH 2233, MATH 3013.

**Description:** Definition of a stochastic process, probability structure, mean and covariance function, the set of sample functions, stationary processes and their spectral analyses, renewal processes, counting processes, discrete and continuous Markov chains, birth and death processes, exponential model, queueing theory. Same course as IEM 5133 & MATH 5133.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Statistics

**STAT 5191 R Programming**

**Prerequisites:** STAT 4013 or STAT 5013.

**Description:** R dataset construction, elementary statistical analysis, and use of statistics and graphics with R. May not be used for degree credit with STAT 4191, STAT 4193, STAT 5191, STAT 5091.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Statistics

**STAT 5193 SAS and R Programming**

**Prerequisites:** STAT 5013 or equivalent.

**Description:** SAS and R dataset construction, elementary statistical analysis, and use of statistics and graphics with SAS and R. May not be used for degree credit with STAT 4091, STAT 4191, STAT 4193, STAT 5191, STAT 5091.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Statistics

**STAT 5213 Bayesian Analysis**

**Prerequisites:** STAT 5013 or STAT 513 or consent of the instructor.

**Description:** Bayes rule, fundamentals of Bayesian statistics, conjugate priors, posterior and predictive inference. Markov chain Monte Carlo, computation and software, hierarchical models, convergence diagnostics, Bayes factor, nonparametric Bayes.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Statistics

**STAT 5223 Statistical Inference**

**Prerequisites:** STAT 5123 and MATH 3013.

**Description:** Convergence concepts, Central Limit Theorem, sampling distributions, point estimation, maximum likelihood methods, Bayesian estimation, Cramer-Rao lower bound, confidence intervals. Hypothesis testing including Neyman-Pearson tests, uniformly most powerful tests, and generalized likelihood ratio tests. Course derives and explains testing and estimation included in introductory statistics courses. Useful for understanding assumptions and theory in common statistical methods. Previously offered as STAT 4223.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Statistics

**STAT 5253 Mathematical Statistics I**

**Prerequisites:** MATH 2163 with a grade of "C" or better.

**Description:** Probability, random variables such as Poisson, Geometric, Hypergeometric, Uniform, Normal, Gamma, Beta, Exponential and their distributions, independence and correlation, multivariate distributions, marginal and conditional probabilities, functions of random variables, order statistics and their distributions, moment generating functions, the Central Limit Theorem. May not be used for degree credit with MATH 4203.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Graduate

**Schedule types:** Lecture

**Department/School:** Statistics
STAT 5263 Mathematical Statistics II
Prerequisites: STAT 5253.
Description: Methods of estimating population parameters such as point and confidence interval estimation for a mean, proportion, and the difference between means and proportions, maximum likelihood methods, method of moments, hypothesis testing and its applications, sample size estimation, linear regression models, and categorical data analysis. May not be used for degree credit with STAT 4213.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 5263 Experimental Designs
Prerequisites: STAT 5023 or STAT 4023 with consent of instructor.
Description: Students will identify treatment structures and design structures, conduct the analyses of data from experimental scenarios, and interpret the results. The understanding and preparation of statistical analysis statements for publication are also covered. Analysis topics include: ANOVA, multiple comparisons, factorial experiments, complete and incomplete block designs, linear mixed models analysis (including repeated measures analysis), split-plot experiments, 2n and 3n factorial experiments, fractional factorial experiments, crossover designs, ANCOVA and SAS programming.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 5263 Theory of Linear Models I
Prerequisites: STAT 5223, MATH 3013, and one of STAT 4023 or STAT 5023.
Description: Matrix theory (generalized inverse, idempotent matrix, and non-negative matrix results), multivariate normal distribution, quadratic forms, chi-square distribution, general linear models, estimability, general hypothesis testing.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 5333 Theory of Linear Models II
Prerequisites: STAT 5323.
Description: Maximum likelihood estimation; one-way and two-way ANOVA models, multiple comparisons, regression models, linear mixed models, variance component estimation.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 5513 Multivariate Analysis
Prerequisites: STAT 5323.
Description: Multivariate normal distribution, simple, partial and multiple correlation, multivariate sampling distributions. Wishart distribution, general T-distribution, estimation of parameters and tests of hypotheses on vector means and covariance matrix. Classification problems, discriminate analysis, and applications.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 5543 Applied Regression Analysis
Prerequisites: One of STAT 4013, STAT 4033, STAT 4053, STAT 5013 or equivalent.
Description: Matrix algebra, simple linear regression, residual analysis techniques, multiple regression, dummy variables, interactions, model building, introduction to logistic regression. This course explains fundamentals of linear regression and provides an introduction to logistic regression. May not be used for degree credit with STAT 4043.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 5563 Statistical Methods II for the Social Sciences
Prerequisites: STAT 3013 or STAT 4013 or STAT 4033 or STAT 4053.
Description: Basic concepts of experimental design. Analysis of variance, covariance, split-plot design. Factorial arrangements of treatments, multiple and curvilinear regression, enumeration data. May not be used for degree credit with STAT 4023 and STAT 4063.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 5590 Seminar in Statistics
Prerequisites: Consent of instructor.
Description: Investigation of special problems in the theory and/or application of statistics using current techniques. Special studies for M.S. level students. Offered for variable credit, 1-6 credits. maximum of 3 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Statistics
STAT 5980 Internship in Statistics
Prerequisites: Consent of instructor.
Description: Directed practicum or internship experience in a Statistics-related professional work setting. Students must have an approved internship that will provide statistical experience beyond that available in the classroom. Students produce written analyses of their work and learning under the guidance of the instructor and internship site supervisor. Offered for variable credit, 1-9 credit hours, maximum of 9 credit hours.
Credit hours: 1-9
Contact hours: Contact: 1-9 Other: 1-9
Levels: Graduate
Schedule types: Independent Study
Department/School: Statistics

STAT 6000 Doctoral Dissertation
Prerequisites: Consent of advisory committee.
Description: Directed research culminating in the PhD thesis. Offered for variable credit, 1-10 credit hours, maximum of 30 credit hours.
Credit hours: 1-10
Contact hours: Contact: 1-10 Other: 1-10
Levels: Graduate
Schedule types: Independent Study
Department/School: Statistics

STAT 6010 Statistics Literature
Prerequisites: Consent of instructor.
Description: Published journal articles from statistics or related areas are discussed. Previously offered as STAT 6001. Offered for fixed credit, 1 credit hour, maximum of 2 credit hours.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 6013 Genetic Statistics
Prerequisites: Elementary Statistics or with the permission of the instructor.
Description: Course provides a statistical basis for analyzing genetic sequence data. Review of basic concepts in statistics including graphical and numerical methods, sample size estimation for biological experiments, and hypothesis testing. Review of basic concepts in genetics including DNA, genes, alleles, polymorphisms, SNP's. Descriptive statistics for genetic sequences, use of statistical tools for sequence analysis and statistical inference with R.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 6113 Probability Theory
Prerequisites: STAT 5123 and MATH 5143.
Description: Measure theoretical presentation of probability, integration and expectation, product spaces and independence, conditioning, different kinds of convergence in probability theory, statistical spaces, characteristic functions and their applications. Previously offered as STAT 5113.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 6203 Large Sample Inference
Prerequisites: STAT 5223 and STAT 6113.
Description: Different types of convergence in probability theory, central limit theorem, consistency, large sample estimation and tests of hypotheses, concepts of asymptotic efficiency, nonparametric tests. Previously offered as STAT 5203.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 6223 Advanced Statistical Inference
Prerequisites: STAT 6113.
Description: Point estimation, maximum likelihood, Cramer-Rao inequality, confidence intervals, Neyman-Pearson theory of testing hypothesis and power of test. Previously offered as STAT 6213.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Statistics

STAT 6910 Special Problems
Prerequisites: Consent of instructor.
Description: Investigation of special problems in the theory and application of statistics using current techniques. Special studies for PhD level students. Offered for variable credit, 1-6 credit hours, maximum of 12 credit hours.
Credit hours: 1-12
Contact hours: Contact: 1-12 Other: 1-12
Levels: Graduate
Schedule types: Independent Study
Department/School: Statistics