STATISTICS (STAT)

STAT 801A Statistical Methods in Research: Non Calculus
Prerequisites: Introductory course in statistics.
Notes: This is an introductory, non-calculus based course for students who will not take statistics courses beyond STAT 802, 803 or 804. Students interested in taking more advanced statistics courses should register for STAT 801B.
Description: Statistical concepts and statistical methodology useful in descriptive, experimental, and analytical study of biological and other natural phenomena. Practical application of statistics rather than on statistical theory.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Grade Pass/No Pass Option
Prerequisite for: AGRO 816E; AGRO 931, ASCI 931, HORT 931; CIVE 963; CIVE 964; NRES 803, STAT 803; STAT 802; STAT 841; STAT 850; STAT 870; STAT 873; STAT 875; STAT 876; STAT 886

STAT 801B Statistical Methods in Research: Calculus
Prerequisites: Introductory statistics course; at least one semester of calculus.
Notes: This course (not STAT 801A) is a pre-requisite for Stat 870, 873, 875 and 876. Can also be used as a pre-requisite for Stat 802 and 803. Students planning on taking statistics courses beyond STAT 802, 803 and 804 should register for this course, not STAT 801A.
Description: Statistical concepts and methodology useful for description, analysis and interpretation of experimental and observational studies. Practical application of statistics and essential background for subsequent courses in statistics.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Grade Pass/No Pass Option
Prerequisite for: STAT 873; STAT 886

STAT 802 Design and Analysis of Research Studies
Prerequisites: STAT 318 or STAT 801A.
Description: Essential statistical characteristics of a research study intended to assess the impact of treatment, environmental or population conditions on response. Focus is on both designed experiments and on studies for which controlled experiments are not feasible but characteristics of controlled experiment must be mimicked to the extent possible. Methods to assess power and compare efficiency of alternative designs are considered. Course covers major design structures, including blocking, nesting, multilevel models, split-plot and repeated measures, and statistical analysis associated with these structures.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Grade Pass/No Pass Option
Prerequisite for: AGRO 816E; ASCI 944, STAT 844; STAT 831; STAT 870; STAT 877; STAT 885; STAT 902

STAT 803 Ecological Statistics
Crosslisted with: NRES 803
Prerequisites: STAT 801 or equivalent; prior experience with "R" software
Notes: Available online.
Description: Model-based inference for ecological data, generalized linear and additive models, mixed models, survival analysis, multi-model inference and information theoretic model selection, and study design.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Grade Pass/No Pass Option

STAT 804 Survey Sampling
Prerequisites: STAT 880 or IMSE 321
Description: Sampling techniques: simple random sampling, sampling proportions, estimation of sample size, stratified random sampling, ratio and regression estimates.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 810 Alpha Seminar
Prerequisites: Statistics graduate student
Description: Program requirements, resources available, tips for academic success, professional statistical organizations, career paths, history of statistics, ethics, statistical conferences, statistical blogs and online forums, frequentist and Bayesian paradigms, current research in department.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Pass No-Pass

STAT 811T Statistics for Middle-Level Teachers
Prerequisites: A valid teaching certificate or permission. An undergraduate coruse in introductory statistics is desirable, but not essential.
Notes: Not open to MA or MS students in mathematics or statistics.
Description: Designed primarily to develop and equip middle-level teachers with the statistical knowledge they need for teaching. The course follows an inquiry/discovery design, dedicating much of class time to activities, discussion and group work. The course emphasizes topics in statistics that are part of the middle-school mathematics curriculum, as well as their application in other disciplines. The course also includes statistics that are used in education and school-based research.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 812T Statistics for High School Teachers
Prerequisites: A valid secondary mathematics teaching certificate.
Notes: Not open to MA or MS students in mathematics or statistics.
Description: The statistical concepts typically taught in a high school statistics class, including linear regression, two-way tables, sampling distributions, statistical inference for means and proportions, chi-square tests, and inference for regression. Some experience with basic statistical concepts (mean, standard deviation, elementary probability) is necessary. The course is inquiry-based, and will emphasize applications and statistical thinking.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 821 Statistical Methods I
Prerequisites: Matrix Algebra; concurrently taking STAT 882, or passed STAT 882 with grade of B or higher, or passed STAT 880 with grade of B or higher.
Notes: Designed for Statistics MS majors and minors.
Description: Introduction to essential statistical methods and supporting design and modeling theory for professional statistical practice. First in a three semester sequence. Focus of this course on methods for single response variable and non-hierarchical study design.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL/SPR
Prerequisite for: ASCI 944, STAT 844; STAT 822; STAT 831; STAT 870; STAT 874; STAT 875; STAT 878; STAT 902; STAT 973

STAT 822 Statistical Methods II
Prerequisites: STAT 821; concurrently taking STAT 883, or passed STAT 883 with grade of B or higher, or passed STAT 880 with grade of B or higher.
Notes: Course is designed for Statistics MS majors and minors.
Description: A continuation of Statistical Methods I. Second in a three semester sequence on essential statistical methods and supporting design and modeling theory for professional statistical practice. Focus in this course of methods for single response variable and multiple sources of random variation.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: STAT 823; STAT 825; STAT 885; STAT 931

STAT 823 Statistical Methods III
Prerequisites: STAT 822; STAT 883 with grade of B or higher, or STAT 880 with grade of B or higher.
Notes: This course is designed for Statistics MS Majors.
Description: Introduction to essential statistical methods and supporting design and modeling theory for professional statistical practice. Third in a three semester sequence. Focus of this course on methods for situations that extend beyond the single-response-variable, designed study cases featured in Statistical Methods I and II. These include multivariate statistics, non-linear models, non- and semi-parametric statistics, observational studies, and other theory and methods deemed appropriate as statistical science continues to evolve.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: STAT 950; STAT 983

STAT 825 Principles of Statistical Consulting and Interdisciplinary Collaboration
Prerequisites: STAT 822 or instructor permission.
Description: Introduction to the role and purpose of statistical consulting and interdisciplinary collaboration. Topics include: asking good questions, dealing with difficult clients, communicating statistics to non-statisticians, determining solutions, and collaborating.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 830 Sensory Evaluation
Crosslisted with: FDST 430, FDST 830, STAT 430
Prerequisites: Introductory course in statistics.
Description: Food evaluation using sensory techniques and statistical analysis.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option
Course and Laboratory Fee: $10

STAT 831 Spatial Statistics
Prerequisites: STAT 802 and knowledge of matrix algebra or Stat 821
Notes: Offered odd-numbered calendar years.
Description: Statistical methods for modeling and analyzing correlated data, with emphasis on spatial correlation. Descriptive statistics, time series, correlograms, semivariograms, kriging and designing experiments in the presence of spatial correlation.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 832 Statistics in Sports
Description: Statistical methods useful for analyzing sports-related data. Descriptive statistics, graphical representations, experimental design, discriminant analysis and optimization.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Grade Pass/No Pass Option

STAT 841 Statistical Methods for High Throughput Biological Data
Prerequisites: STAT 801A or equivalent.
Description: Basic biological concepts. Multiple testing and false discovery rate. Second generation sequencing and statistical issues. ChIP-seq. RNA-seq. Empirical Bayes methods and software. Normalization, experimental design and commonly used models for microarray data. Metabolomics.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 842 Computational Biology
Crosslisted with: BIOC 842, STAT 442, BIOC 442
Prerequisites: Any introductory course in biology, or genetics, or statistics.
Description: Databases, high-throughput biology, literature mining, gene expression, next-generation sequencing, proteomics, metabolomics, system biology and biological networks.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 843 Next-Generation Sequencing and Systems Biology
Prerequisites: Any introductory course in biology, statistics, computer science or mathematics
Description: Next-generation RNA and genome sequencing, systems biology. Regulatory networks of transcription, protein-protein interaction networks, theory and practice. Databases, data integration and visualization. Students present computational biology publications and projects.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

STAT 844 Quantitative Methods for Genomics of Complex Traits
Crosslisted with: ASCI 944
Prerequisites: ASCI 861U or AGRO/ASCI/HORT 931 or BIOS 818 or equivalent; STAT 802 or 821 or equivalent.
Description: Quantitative genetic analysis of complex traits. Quantitative methodologies for connecting phenotypes with high-dimensional genomic information to understand polygenic traits from both prediction and inference perspectives.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: SPRING

STAT 847 Biometrical Genetics and Plant Breeding
Crosslisted with: AGRO 932
Prerequisites: AGRO 931
Notes: STAT 802 recommended. Offered odd-numbered calendar years.
Description: Theoretical concepts involved in planning breeding programs for the improvement of measurable morphological, physiological, and biochemical traits that are under polygenic control in crop plants of various types.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 850 Computing Tools for Statisticians
Prerequisites: STAT 801A or equivalent; STAT 462, 880, or equivalent is recommended.
Description: Introductions to statistical computing packages and document preparation software. Topics include: graphical techniques, data management, Monte Carlo simulation, dynamic document preparation, presentation software.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Grade Pass/No Pass Option

STAT 862W Applied Variance Component Estimation in Livestock Genetics
Crosslisted with: ASCI 862W
Prerequisites: ASCI 862V
Notes: This is a 5-week course taught by Speidel and Enns (Colorado State University). Permission required before registering. Contact the Animal Science Department at 402-472-6440.
Description: Principles in the estimation of (co)variance components and genetic parameters required to solve mixed models typical in livestock genetics. Focus on applied knowledge of approaches used to estimate the G and R sub-matrices of the mixed model equations. Demonstrate models commonly used in parameter estimation. Introduce scientific literature concerning implementation, and attributes of the solutions, of variance component estimation strategies.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded

STAT 868 An Introduction to R Programming
Crosslisted with: ASCI 868
Prerequisites: Graduate Standing
Notes: This is a 5-week course taught by Maltecca (North Carolina State University).
Description: Introduction to the R environment for statistical computing, including use of R as a high-level programming language and as a gateway for more formal low-level languages. Material includes language structure, basic and advanced data manipulation, statistical analysis with R, and using R as a programming language.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded
Prerequisite for: ASCI 869, STAT 869

STAT 869 MCMC Methods in Animal Breeding: A Primer
Crosslisted with: ASCI 869
Prerequisites: ASCI 868
Notes: This is a 5-week course taught by Maltecca (North Carolina State University).
Description: Principles of Markov Chain Monte Carlo (MCMC) methods in animal breeding. Materials include random variable generation, Monte Carlo integration, stochastic search, Expectation-maximization (EM) algorithm and Monte Carlo EM, Markov Chain principles, Metropolis-Hastings algorithm, Gibbs sample, and MCMC for genomic data. Illustrations developed using R software.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded

STAT 870 Multiple Regression Analysis
Prerequisites: STAT 801A, STAT 802 or STAT 821 concurrently
Description: Linear regression and related analysis of variance and covariance methods for models with two or more independent variables. Techniques for selecting and fitting models, interpreting parameter estimates, and checking for consistency with underlying assumptions. Partial and multiple correlation, dummy variables, covariance models, stepwise procedures, response surfaces estimation, and evaluation of residuals.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option
Prerequisite for: STAT 874; STAT 878; STAT 902; STAT 974

STAT 871 Generalized, linear, and mixed models
Prerequisites: STAT 880 or concurrent STAT 883; MATH 314
Notes: For non-majors only.
Description: Methods and underlying theory for analyzing data based on generalized, linear, and mixed models.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 873 Applied Multivariate Statistical Analysis
Prerequisites: STAT 801A or STAT 801B
Notes: For non-majors only. STAT 870 recommended
Description: Multivariate techniques used in research. Reduction of dimensionality and multivariate dependencies, principal components, factor analysis, canonical correlation, discriminant analysis, cluster analysis, multivariate extensions to the analysis of variance, and the general linear model.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option
Prerequisite for: STAT 973

STAT 874 Nonparametric Statistics
Prerequisites: STAT 821 or STAT 870
Description: Introduction to nonparametric statistics - methodology and supporting theory. Focus of this course is broadly divided into three components: traditional (e.g. distribution-free hypothesis testing), function estimation (e.g. alternatives to parametric linear and nonlinear models) and modern methods that emphasize prediction (e.g., density estimation, robustness, computational methods, reproducing kernel Hilbert space methods).
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: SPRING

STAT 875 Categorical Data Analysis
Prerequisites: STAT 801A or STAT 821
Description: Analysis of contingency tables. Regression models for binary, multi-category, and count responses. Tools for model building. Exact inference methods.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 876 Introduction to Survival Analysis
Prerequisites: STAT 801A.
Notes: Offered every other odd-numbered calendar year. Knowledge of at least one statistical package (SAS, R, Splus, SPS) is required.
Description: Application, theory and computational aspects of survival analysis. Survival and hazard functions; parametric models for survival data; censoring and truncation mechanisms; nonparametric estimation (confidence bands for the survival function, interval estimation of the mean and median survival time); univariate estimation of the hazard function; hypothesis testing; regression models (with fixed covariates, with time dependent covariates); and model diagnostics.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 877 Introduction to Mixed Model Analysis
Prerequisites: STAT 802
Description: Practical application of mixed models for data analysis, estimation, prediction, and testing. This course covers linear mixed models (LMM) for normally distributed data and generalized linear mixed models (GLMMs) for non-normally distributed data.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option
Offered: SPRING
Prerequisite for: STAT 902

STAT 878 Time Series Analysis
Prerequisites: STAT 870 or STAT 821 and either STAT 880 or concurrent STAT 883
Description: Introduction to models for data observed over time. Both theoretical and practical aspects of time series models will be presented. Main topics include the Box-Jenkins model class, spectral analysis, and GARCH models. Forecasting will be emphasized throughout. The main statistical software package used will be R. Other statistical software packages and programming languages will be introduced as needed.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

STAT 880 Introduction to Mathematical Statistics
Prerequisites: MATH 208 or 107H; STAT 218 or equivalent
Notes: STAT 880 is not open to students earning a MA or MS degree in mathematics or statistics. This course requires command of material covered in MATH 107 or 107H, and STAT 218. It is also recommended to have command of materials covered in MATH 208 or 208H.
Description: Introductory mathematical statistics. Probability calculus; random variables, their probability distributions and expected values; sampling distributions; point estimation, confidence intervals and hypothesis testing theory and applications.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option
Prerequisite for: CSCE 970; ECON 917; MECH 945; STAT 804; STAT 821; STAT 822; STAT 823; STAT 871; STAT 878; STAT 884; STAT 885; STAT 886

STAT 882 Mathematical Statistics I-Distribution Theory
Prerequisites: MATH 208 or MATH 107H.
Description: Sample space, random variable, expectation, conditional probability and independence, moment generating functions, special distributions, sampling distributions, order statistics, limiting distributions and central limit theorem.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option
Prerequisite for: ECON 917; STAT 821; STAT 883; STAT 973

STAT 883 Mathematical Statistics II-Statistical Inference
Prerequisites: STAT 882
Description: Interval estimation; point estimation, sufficiency and completeness; Bayesian procedures; uniformly most powerful tests, likelihood ratio test, goodness of fit tests.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option
Prerequisite for: STAT 822; STAT 823; STAT 878; STAT 885; STAT 886; STAT 931; STAT 950; STAT 980; STAT 982; STAT 983

STAT 884 Applied Stochastic Models
Prerequisites: STAT 880 or IMSE 321 or equivalent
Description: Introduction to stochastic modeling in operations research. Includes the exponential distribution and the Poisson process, discrete-time and continuous-time Markov chains, renewal processes, queueing models, stochastic inventory models, stochastic models in reliability theory.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 885 Introduction to Data Mining and Machine Learning
Prerequisites: STAT 880 or STAT 883 and STAT 802 or STAT 822
Notes: Suggested co-requisite STAT 823; Some working knowledge of SQL would be very useful.
Description: The key topics represent the main areas of data mining and machine learning aimed at achieving predictive accuracy more than physical modeling. These topics are standard classification methods, regularization methods, visualization and geometry of data, leading to kernel methods. Finally, the course introduces trees, neural nets, and model averaging.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 886 Applied Bayesian Analysis
Prerequisites: STAT 801A or STAT 801B and either STAT 880 or concurrent STAT 883.
Description: Bayesian data analysis with emphasis on application and computation using R or similar software. Topics include: probability models, prior distributions, Bayes theorem, single parameter models, posterior predictive distribution, Gibbs sampling, MCMC simulations, regression models, generalized linear models, hierarchical models, model checking and diagnostics.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: STAT 986

STAT 889 Statistics Seminar
Prerequisites: Permission
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Grade Pass/No Pass Option

STAT 892 Topics in Statistics and Probability
Prerequisites: Permission
Description: Special topics in either statistics or the theory of probability.
Credit Hours: 1-5
Min credits per semester: 1
Max credits per semester: 5
Max credits per degree: 24
Grading Option: Grade Pass/No Pass Option

STAT 898 Statistics Report
Prerequisites: Permission
Description: A student may take this class and prepare a Statistics report under the supervision of his/her faculty advisor.
Credit Hours: 0-6
Min credits per semester:
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Grade Pass/No Pass Option

STAT 899 Masters Thesis
Prerequisites: Admission to the Masters Degree Program and permission of major adviser
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 99
Grading Option: Grade Pass/No Pass Option

STAT 902 Advanced Experimental Design
Prerequisites: STAT 821 or STAT 877 or both STAT 802 and STAT 870
Description: Advanced design concepts, theory and methods used in: construction, analysis and interpretation of incomplete block designs, split-plots, confounded and fractional factorials, screening designs, response surface methods, and other topics.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 930 Advanced Statistical Consulting and Interdisciplinary Collaboration
Prerequisites: Permission
Notes: For advanced Masters degree students or PhD students in Statistics.
Description: Exposure to more complex statistical consulting problems and how to resolve them. Topics include: major areas of consulting, interdisciplinary collaboration, and effective communication. Students will assemble a portfolio of project reports that can be shared with prospective employers.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Grade Pass/No Pass Option

STAT 931 Advanced Spatial and Spatio-temporal Statistics
Prerequisites: STAT 822 and STAT 883
Notes: Suggested prerequisite: STAT 831
Description: This course provides a development of theory and methods for spatial and spatio-temporal statistics. It provides the mathematical foundations and methodological development for topics such as MLE and in-fill asymptotics, non-Gaussian/non-stationary spatial processes, spatio-temporal models, and Bayesian methodology. R will be the main programing language.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 950 Computational Statistics I
Prerequisites: STAT 883; STAT 823 or concurrent enrollment.
Notes: Prior experience with "R" software is required.
Description: Statistical computing needed for research and advanced statistical analyses. Topics include: bootstrap, high performance computing, jackknife, Linux, Markov chain Monte Carlo, Monte Carlo simulation, numerical differentiation and integration, optimization, parallel processing, permutation tests.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option
Prerequisite for: STAT 951

STAT 951 Computational Statistics II
Prerequisites: STAT 950
Notes: Knowledge of a high-level programming language is recommended
Description: A continuation of Computational Statistics I. Topics will be chosen from big data management and data analysis, data generation, high performance and throughput computing, importance sampling, machine learning, optimization, programming languages, web scraping, working with databases.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 973 Theory of Multivariate Analysis
Prerequisites: STAT 873, STAT 882 and STAT 821 or equivalent
Description: Statistical inference concerning parameters of multivariate normal distributions with applications to multivariate datasets.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 974 Nonlinear Regression Analysis
Prerequisites: STAT 870 and introductory calculus.
Description: Basic concepts of nonlinear models and their associated applications. Estimating the parameters of these models under the classical assumptions as well as under relaxed assumptions. Major theoretical results and implementation using standard statistical software.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 980 Advanced Probability Theory I
Prerequisites: STAT 883
Notes: This course requires command of material covered in MATH 325 or equivalent.
Description: Construction of probability spaces, random variables and expectations, monotone and dominated convergence theorems, Fatou's lemma, modes of convergence, Kolmogorov law of large numbers, central limit theory, conditional probability given a sigma field.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option
Prerequisite for: STAT 981; STAT 984; STAT 986

STAT 981 Advanced Probability Theory II
Prerequisites: STAT 980
Description: A continuation of STAT 980 providing depth in probability theory and stochastic processes. Topics include convergence properties of random variables and treatment of several important stochastic processes.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 982 Advanced Inference
Prerequisites: STAT 883
Description: Uniformly minimum variance unbiased estimators, decision-theoretic Bayes estimation, frequentist testing (likelihood ratio tests, Neyman-Pearson lemma, uniformly most powerful tests), Bayes testing and Bayes factors, nonparametric tests, multiple comparisons procedures.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option
Prerequisite for: STAT 986

STAT 983 Statistical Learning
Prerequisites: STAT 823, STAT 883
Description: Model selection including sparsity methods and their oracle properties, information methods, cross-validation and stochastic search. Basic theory of kernel methods for regression. Classification: linear and quadratic discriminants, Bayes classifier, nearest neighbor methods, kernel methods for classification. Introduction to neural networks and recursive partitioning. Model averaging methods and measures of complexity. Cluster analysis.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 984 Asymptotics and Applications
Prerequisites: STAT 980
Description: A continuation of STAT 980 providing breadth in commonly occurring major subfields of statistics that rely heavily on probability theory. Large sample theory estimation, testing, expansion, and convergence in a variety of settings.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

STAT 986 Theoretical Foundations of Bayesian Analysis
Prerequisites: STAT 886; and at least one of STAT 980 or STAT 982.
Description: The foundational ideas and structure of Bayesian theory from its axiomatic and fundamental assumptions, including Savages axioms, complete class theorems, sequential properties, prior selection, model selection, Bayesian nonparametrics, and asymptotics for both the parametric and nonparametric cases.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

STAT 992 Advanced Topics in Probability and Statistics
Prerequisites: Permission
Description: Special topics in either statistics or probability.
Credit Hours: 1-5
Min credits per semester: 1
Max credits per semester: 5
Max credits per degree: 24
Grading Option: Grade Pass/No Pass Option

STAT 997 Graduate Practicum / Internship
Description: Participation in the activities of a practicing statistician.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Grade Pass/No Pass Option

STAT 999 Doctoral Dissertation
Prerequisites: Admission to Doctoral Degree Program and permission of supervisory committee
Description: Doctoral Dissertation Research
Credit Hours: 1-24
Min credits per semester: 1
Max credits per semester: 24
Max credits per degree: 55
Grading Option: Pass No-Pass