STA 5223 Applied Sample Survey Methods 3 Credits
Grading Scheme: Letter Grade
Designing and analyzing sample surveys. Sources of error. Questionnaire design. Simple random, stratified, systematic, and cluster sampling. Practical application of concepts.
Prerequisite: STA 2023, 4322, STA 6126, or STA 6166.

STA 5325 Fundamentals of Probability 3 Credits
Grading Scheme: Letter Grade
Topics in probability and statistics, particularly discrete and continuous random variables, sampling distributions, estimation, and hypothesis testing. Applications to engineering and natural science.
Prerequisite: grade of C or better in MAC 2313 and STA 3032 or equivalent.

STA 5328 Fundamentals of Statistical Theory 3 Credits
Grading Scheme: Letter Grade
Direct continuation of STA 4321/STA 5325. Basic material for distribution theory, sampling distributions, properties of estimators, hypothesis testing, linear regression analysis, and analysis of variance. A good knowledge of calculus is helpful.
Prerequisite: STA 4321 or equivalent.

STA 5503 Categorical Data Methods 3 Credits
Grading Scheme: Letter Grade
Description and inference using proportions and odds ratios, multi-way contingency tables, logistic regression and other generalized linear models, and loglinear models applications.
Prerequisite: STA 3024, 3032, 4210, 4322, STA 6127, or STA 6167.
Intended for graduate students not majoring in statistics.

STA 5507 Applied Nonparametric Methods 3 Credits
Grading Scheme: Letter Grade
Introduction to nonparametric statistics. Includes one- and two-sample testing and estimation methods, one- and two-way layout models, and correlation and regression models.
Prerequisite: STA 2023, 3032, 4210, 4322, STA 6126, STA 6166. Intended for graduate students not majoring in statistics.

STA 5701 Applied Multivariate Methods 3 Credits
Grading Scheme: Letter Grade
Review of matrix theory, univariate normal, t, chi-squared and F distributions, and multivariate normal distributions. Inference about multivariate means, Hotelling’s T2 multivariate analysis of variance, multivariate regression, and multivariate repeated measures. Inference about covariance structure, principal components, factor analysis, and canonical correlation. Multivariate classification techniques, discriminant and cluster analysis. Additional topics at the discretion of the instructor, time permitting.
Prerequisite: STA 3024, STA 6127, STA 6167, or 4211. Intended for graduate students not majoring in statistics.

STA 5856 Applied Time Series Methods 3 Credits
Grading Scheme: Letter Grade
Stationarity, autocorrelation, ARMA models, non-stationary processes, ARIMA models, regression with ARMA errors, model-based forecasting, forecasting algorithms.
Corequisite: STA 4322 or STA 5328.

STA 6092 Applied Statistical Practice 3 Credits
Grading Scheme: Letter Grade
Communication, management, and the organizational, computational, and statistical thinking skills needed for consulting in statistics. Integrating graphic and numeric computing tools, research design concepts, data summary, and statistical inference methods.
Prerequisite: STA 6208

STA 6126 Statistical Methods in Social Research I 3 Credits
Grading Scheme: Letter Grade
Descriptive statistics, estimation, significance tests, two-sample comparisons, methods for nominal and ordinal data, regression and correlation, introduction to multiple regression.

STA 6127 Statistical Methods in Social Research II 3 Credits
Grading Scheme: Letter Grade
Further topics in multiple regression, model building, analysis of variance, analysis of covariance, multivariate analysis of categorical data.
Prerequisite: STA 6126.

STA 6166 Statistical Methods in Research I 3 Credits
Grading Scheme: Letter Grade
Statistical methods based on t, F, and Chi2 tests. Analysis of variance for basic experimental designs. Factorial experiments. Regression analysis and analysis of covariance.
Prerequisite: STA 2023 or equivalent.

STA 6167 Statistical Methods in Research II 3 Credits
Grading Scheme: Letter Grade
Analysis of covariance and general linear model. Factorial, nested, split-plot, and incomplete block designs. Analysis of count data.
Prerequisite: STA 6166.

STA 6177 Applied Survival Analysis 3 Credits
Grading Scheme: Letter Grade
Focusing on survival analysis, Kaplan-Meier estimates, proportional hazards model, related tests, phase I, II, and III clinical trials, designs and protocols.
Prerequisite: STA 6327

STA 6207 Regression Analysis 3 Credits
Grading Scheme: Letter Grade
Focusing on simple linear regression; multiple regression; model selection residual analysis; influence diagnostics’ multicollinearity, anova and regression; generalized linear models; nonlinear regression.
Prerequisite: STA 4322

STA 6208 Basic Design and Analysis of Experiments 3 Credits
Grading Scheme: Letter Grade
Focusing on the principles of experimental design, completely randomized design (analysis, contrasts, diagnostics), random effects models, factorial experiments (fixed, random, and mixed effect), block designs, Latin squares, split plots, and full and fractional factorial experiments.
Prerequisite: STA 6207

STA 6246 Theory of Linear Models 3 Credits
Grading Scheme: Letter Grade
Theory of Linear Models
Prerequisite: STA 6208, STA 6327, STA 6329.
STA 6326 Introduction to Theoretical Statistics I 3 Credits  
Grading Scheme: Letter Grade  
Prerequisite: MAC 2313.

STA 6327 Introduction to Theoretical Statistics II 3 Credits  
Grading Scheme: Letter Grade  
Estimation and hypothesis testing. Sufficiency, information, estimation, maximum likelihood, confidence intervals, uniformly most powerful tests, likelihood ratio tests, sequential testing, univariate normal inference, decision theory, analysis of categorical data.  
Prerequisite: STA 6326.

STA 6329 Matrix Algebra and Statistical Computing 3 Credits  
Grading Scheme: Letter Grade  
Basic theory of determinants, inverses and generalized inverses, eigenvalues and eigenvectors; applications of partitioned matrices; diagonalization and decomposition theorems; applications in least squares.  
Prerequisite: MAC 3313.

STA 6505 Analysis of Categorical Data 3 Credits  
Grading Scheme: Letter Grade  
Prerequisite: STA 6327 and STA 6208 or consent of instructor.

STA 6707 Analysis of Multivariate Data 3 Credits  
Grading Scheme: Letter Grade  
Techniques for analyzing multivariate data. Emphasis on MANOVA and tests on the structure of the dispersion matrix. Topics will include discriminant, factor, profile, and cluster analyses.  
Prerequisite: STA 6208 and facility in a computer language.

STA 6866 Monte Carlo Statistical Methods 3 Credits  
Grading Scheme: Letter Grade  
Introduction to Monte Carlo statistics.  
Prerequisite: STA 6327 and STA 6208, or consent of instructor.

STA 6905 Individual Work 1-5 Credits, Max 10 Credits  
Grading Scheme: Letter Grade  
Special topics designed to meet the needs and interests of individual students.  
Prerequisite: departmental approval.

STA 6910 Supervised Research 1-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Supervised Research

STA 6934 Special Topics in Statistics 1-4 Credits, Max 12 Credits  
Grading Scheme: Letter Grade  
Special Topics in Statistics  
Prerequisite: permission of graduate adviser.

STA 6938 Seminar 1 Credit, Max 15 Credits  
Grading Scheme: S/U  
Special topics of an advanced nature suitable for seminar treatment but not given in regular courses.  
Prerequisite: departmental approval.

STA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits  
Grading Scheme: S/U  
Supervised Teaching

STA 6942 Internship 1-3 Credits, Max 3 Credits  
Grading Scheme: S/U  
Supervised statistical consulting involving planning and/or analyzing research data. Whenever possible, student meets with researcher. Supervision by faculty member or delegated authority and post-internship report.  
Prerequisite: STA 6208 or equivalent and consent of graduate coordinator.

STA 6971 Research for Master's Thesis 1-15 Credits  
Grading Scheme: S/U  
Research for Master's Thesis

STA 7179 Survival Analysis 3 Credits  
Grading Scheme: Letter Grade  
Theoretical introduction to statistical inferential procedures useful for analyzing randomly right censored failure time data.  
Prerequisite: STA 6177.

STA 7249 Generalized Linear Models 3 Credits  
Grading Scheme: Letter Grade  
Fitting of generalized linear models, diagnostics, asymptotic theory, overdispersion, estimating equations, mixed models, generalized additive models, smoothing.  
Prerequisite: STA 6208, 6208, STA 6327, STA 6246.

STA 7334 Limit Theory 3 Credits  
Grading Scheme: Letter Grade  
Prerequisite: STA 6467.

STA 7346 Statistical Inference 3 Credits  
Grading Scheme: Letter Grade  
Decision rules and risk functions. Sufficiency, Minimax, and Bayes rules for estimating location and scale parameters.  
Prerequisite: STA 6327.

STA 7347 Advanced Inference 3 Credits  
Grading Scheme: Letter Grade  
Bayesian statistical inference. Inference using large samples. Relative efficiencies of tests and estimates with special reference to Pitman and Bahadur efficiencies.  
Prerequisite: STA 7346.

STA 7348 Bayesian Theory 3 Credits  
Grading Scheme: Letter Grade  
Theory underlying the Bayesian paradigm. Issues related to selection of priors; Bayesian interference, both exact and asymptotic; Bayesian model selection; high-dimensional problems; and Bayesian robustness.  
Prerequisite: STA 7346
STA 7466 Probability Theory I 3 Credits
Grading Scheme: Letter Grade
Prerequisite: MAA 5228, MAA 6236, or equivalent.

STA 7467 Probability Theory II 3 Credits
Grading Scheme: Letter Grade
Prerequisite: STA 7466.

STA 7828 Topics in Stochastic Processes 3 Credits
Grading Scheme: Letter Grade
Branching processes, Brownian motion, continuous state space Markov chains, diffusion processes, Markov chain Monte Carlo, martingales, point processes, renewal processes, stationary processes, stochastic calculus, stochastic differential equations.
Prerequisite: STA 6466 and STA 6467.

STA 7934 Special Topics in Statistics 1-9 Credits, Max 15 Credits
Grading Scheme: Letter Grade
Possible Topics: Smoothing Methods, Analysis of Longitudinal Data, Data Mining and Statistical Learning, Mixed Models, Theory and Methods, Resampling Methods, Functional Data Analysis.
Prerequisite: Permission of Graduate Coordinator.

STA 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

STA 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation