**BST 639** COMPUTING TOOLS FOR THE BIOMEDICAL SCIENCES. (3)
This course is an introduction to statistical and epidemiologic software technologies commonly used for the collection, management, and analysis of data. Prereq: STA 580 or consent of instructor and basic computer literacy. (Same as CPH 639.)

**BST 675** BIOMETRICS I. (4)
This course, the first of a two-semester sequence in biometrics, introduces probability, discrete random variables, continuous random variables, joint distributions, and sampling distributions. Prereq: STA 580 and MA 114 or equivalent.

**BST 676** BIOMETRICS II. (4)
This course, the second of a two-semester sequence in biometrics, introduces techniques for constructing and evaluating point estimators, hypothesis testing procedures, and interval estimators. Prereq: BST 675.

**BST 701** BAYESIAN MODELING IN BIOSTATISTICS. (3)
This course provides an introduction to Bayesian ideas and data analysis applied to the biosciences. The course illustrates current approaches to Bayesian modeling and computation in biostatistics. Prereq: BST 760 and BST 676 or equivalent.

*BST 713** CLINICAL TRIALS. (3)
Design and analysis of Phase I-III clinical trials, interim monitoring of trials, sample size, power, crossover trials, bioequivalency, mixed models, and meta analysis. Coreq: STA 603. (Same as STA 653.)

**BST 740** SPATIAL STATISTICS. (3)
This course will cover risks and rates, types of spatial data, visualizing spatial data, analysis of spatial point patterns, spatial clustering of health events based on case control studies, and based on regional counts, linking spatial exposure data to health events through regression modeling, Bayesian spatial analysis. Prereq: BST 760.

**BST 760** ADVANCED REGRESSION. (3)
This course provides an introduction to theoretical methods and applications of linear and generalized linear models. Regression methods for normally distributed outcomes will provide a discussion of experimental design, design matrices, and modes of parametric inference for the linear model. Students will learn to apply these concepts in sophisticated data analysis where they will implement tools for model building and selection, variable selection, and handling categorical predictors, confounders and interactions. Additionally, students will learn polynomial regression and flexible alternatives such as weighted least squares and robust, ridge and nonparametric regression. Regression models for non-normal outcomes (focusing on binomial and count data) will be covered in detail, providing students with foundational tools for understanding and implementing generalized linear models that are commonly used to analyze epidemiologic and public health data from various study designs including but not limited to cohort, case-control, and clinical trials. Prereq: BST 675 and STA 580; coreq: BST 676.

**BST 761** TIME TO EVENT ANALYSIS. (3)

*BST 762** LONGITUDINAL DATA ANALYSIS. (3)
This course presents statistical techniques for analyzing longitudinal studies and repeated measures experiments that occur frequently in public health, clinical trials, and outcomes research. This course will cover linear mixed models, generalized linear mixed models and an introduction to nonlinear models as they apply to the analysis of correlated data. Prereq: BST 676 and BST 760 OR STA 603 and STA 607. (Same as STA 632.)

**BST 763** ANALYSIS OF CATEGORICAL DATA. (3)
Multinomial and product-multinomial models; large-sample theory of estimation and testing, Pearson chi-square and modified chi-square statistics, Pearson-Fisher Theorem, Wald Statistics and generalized least squares technique; applications to problems of symmetry, association and hypotheses of no interaction in multi-dimensional contingency tables. Prereq: STA 603. (Same as STA 665.)
BST 764 APPLIED STATISTICAL MODELING FOR MEDICINE AND PUBLIC HEALTH. (3)
This course introduces some useful statistical models not typically encountered in the core courses of a master’s or doctoral biostatistics curriculum. These include finite mixture models, nonparametric regression models, covariance-based models, and stochastic models. Prereq: BST 675 and BST 760.

BST 765 MISSING DATA METHODOLOGY FOR PUBLIC HEALTH. (3)
This course surveys methods for analyzing data with missing observations. This includes methods for data missing completely at random including hot deck cold deck, mean substitution, and single imputation; methods for data missing at random including multiple imputation and weighted estimating equations and methods for data missing not at random including pattern mixture models, selection models, and shared random effects models. Prereq: BST 676 and BST 762.

BST 766 ANALYSIS OF TEMPORAL DATA IN PUBLIC HEALTH. (3)
This course surveys methods for analyzing public health data collected over time. Methods covered include smoothing time series data, the modeling of stationary time series for Gaussian, dichotomous, and case count responses, methods for detecting the clustering of disease over time, and methods for the surveillance of infectious diseases in real time. Prereq: BST 675 and BST 760.