

BST

Biostatistics

BST 230 STATISTICAL THINKING IN PUBLIC HEALTH. (3)

BST 230 provides students with an introduction to statistical concepts that are important for solving real-world public health problems. This course will present statistical principles and associated scientific reasoning underlying public health practice and health policy decision-making. Topics include data visualization, summary statistics, statistical inference, study design and data analysis, and strategies for articulating and evaluating claims using statistical constructs. Prereq: UK Core course in Quantitative Foundations.

BST 655 INTRODUCTION TO STATISTICAL GENETICS. (3)

BST 655 presents an introduction to the statistical methodologies used today to investigate genetic susceptibility to complex diseases. The course focuses on linkage and association analysis with applications to real-world data. Commonly used (and freely available) software will be presented and used throughout. Because the field is constantly evolving, a focus of the material for this course will be recent statistical human genetics literature. Prereq: STA 580 or equivalent. (Same as STA 655.)

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 681 LINEAR REGRESSION. (3)

This course, the first in a two-semester sequence in regression modeling, covers linear regression models for normally distributed outcomes. The course will cover simple and multiple linear regression, estimation, interpretation, hypothesis testing, model building and diagnostics, matrix algebra for regression, and an introduction to design of experiments. The course will include the use of computing tools to apply these models to real data. Prereq: STA 580 or consent of instructor.

BST 682 GENERALIZED LINEAR MODELS. (3)

This course, the second in a two-semester sequence in regression modeling, covers regression models for outcomes which are not normally distributed, such as binary and count data. The course will cover the generalized linear model framework, multivariate maximum likelihood theory, logistic regression, Poisson regression, and nominal and ordinal logistic regression models, as well as approaches for building and checking these models. The course will include the use of computing tools to apply these models to real data. Prereq: BST 675, BST 681.

BST 693 STATISTICAL PRACTICE IN PUBLIC HEALTH. (3)

To provide an introduction to statistical practice in public health including improved statistical communication (how to ask good questions in a consulting session, writing analysis plans, and how to express results both orally and in writing), programming for reproducibility and data ethics, and utilizing statistical methodology for problem solving in public health research. Prereq: CPH 630/STA 681 or equivalent and CPH 535 or equivalent.

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 682 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)

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 682.

BST

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BST 761 TIME TO EVENT ANALYSIS. (3)

Analysis of time to event data encountered in Public Health and Medicine. Survival distributions and hazard functions. Time to event analysis using Kaplan-Meier method and life-table method. Accelerated failure time model, logit model for discrete data, complimentary log-log model, and proportional hazards model. Tests for goodness-of-fit, graphical methods, and residual and influence statistics. Time-dependent covariates, non-proportional hazards, left truncation, and late entry into the risk set. Sample size and power, competing risks, and time to event analysis with missing data. Prereq: STA 580 or equivalent.

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 682 and BST 676. (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 and STA 606. (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 682 and BST 676.

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 682 and BST 676.