

PHD Statistic Options

The following courses were reviewed by members of the Graduate Programs Committee, PhD subcommittee on Oct 1, 2015. The committee determined that these courses could be appropriate to meet the PhD Program requirement for scholarly inquiry – advanced statistics. Additional or new courses may also be offered that are sufficient to meet the requirement. Student selection of specific statistics coursework should be made in consultation with their faculty advisor. Following the list of statistical coursework are a number of related methods courses that may be of interest, and could be complementary to the student's individual program plan.

COURSEWORK TO MEET THE STATISTICS REQUIREMENT:

BIOMEDICAL & MEDICAL INFORMATICS (BMI)/STATS 541 Introduction to Biostatistics

Course Description: Course designed for the biomedical researcher. Topics include: descriptive statistics, hypothesis testing, estimation, confidence intervals, t-tests, chi-squared tests, analysis of variance, linear regression, correlation, nonparametric tests, survival analysis and odds ratio. Biomedical applications used for each topic.

BMI/POPULATION HEALTH (POP HLTH) 552 Regression Methods for Population Health

Course Description: Introduction to the primary statistical tools used in epidemiology and health services research; multiple linear regression, logistic regression and survival analysis.

POP HLTH 551 Introduction to Biostatistics for Population Health

Course Description: Course designed for population health researcher. Topics include descriptive statistics, elementary probability, probability distributions, one- and two-sample normal inference (point estimation, hypothesis testing, confidence intervals), power and sample size calculations, one- and two-sample binomial inference, underlying assumptions and diagnostic work

EDUCATIONAL PSYCHOLOGY (ED PSYCH) 760/761 Sequence Statistical Methods Applied to Education I/II

Course Description (760): Introductory descriptive statistics and statistical inference; measures of central tendency and variability, confidence intervals, theory of hypothesis testing, correlation techniques.

Course Description (761): Analysis of variance and covariance, multiple linear regression; chi-square and various nonparametric techniques.

ED PSYCH 762 Introduction to the Design of Educational Experiments

Course Description: Classical experimental designs and their application to educational research, factorial treatment arrangements, confounding, repeated measures design, and related topics.

ED PSYCH 763 Regression Models in Education

Course Description: An applied introduction to regression techniques is given, covering nonparametric regression, multiple linear regression and logistic regression. All applied analyses are done in the statistical programming language R.

ED PSYCH 861 Statistical Analysis and Design in Educational Research

Course Description: A non-parametric perspective of classical experimental designs and their application to educational research, factorial treatment arrangements, repeated measures designs, and related topics.

ED PSYCH/EDUCATIONAL LEADERSHIP AND POLICY ANALYSIS (ELPA) 822 Introduction to Quantitative Inquiry in Education

Course Description: Prepares doctoral students to use the concepts and methods of quantitative social science research to conduct research on education issues. Topics include hypothesis testing, statistical inference, point estimates, graphic and numerical data displays, correlation and regression

ED PSYCH/ELPA 964 Hierarchical Linear Modeling

Course Description: Introduction to the statistical methodology of hierarchical linear modeling, including random intercept and random slope and intercept models; models for longitudinal data; and multilevel generalized linear models.

STATS 849 Theory and Application of Regression and Analysis of Variance I

Course Description: Theory and applications of the general linear model; graphical methods; simultaneous inference; regression diagnostics; analysis of variance of fixed, random and mixed effects models; ANCOVA: violations of assumptions

STATS 850 Theory and Application of Regression and Analysis of Variance II

Course Description: Theory and applications of the general linear model; graphical methods; simultaneous inference; regression diagnostics; analysis of variance of fixed, random and mixed effects models; ANCOVA: violations of assumptions

STATS 601 Statistical Methods I

Course Description: Together with Stat 602, this course is to provide graduate students in statistics and related quantitative fields with a thorough grounding in modern statistical methods. The specific outcomes for the course are to understand data collection in context (how/why data were collected, key questions under study); explore data by effective graphical and numerical summaries; understand probability concepts and models as tools for studying random phenomena and for statistical inference; analyze data using appropriate, modern statistical models, methods, and software; understand the statistical concepts underlying methods; develop the ability to interpret results and critically evaluate the methods used; communicate data analysis and key findings in context

BMI/STATS 641 Statistical Methods for Clinical Trials

Course Description: Statistical issues in the design of clinical trials, basic survival analysis, data collection and sequential monitoring. Intended for stats grad students; those with medical backgrounds should take Stat 542.

BMI/STATS 642 Statistical Methods for Epidemiology

Course Description: Methods for analysis of case-control, cross sectional, and cohort studies. Covers epidemiologic study design, measures of association, rates, classical contingency table methods, and logistic and Poisson regression

BMI/POP HLTH 651 Advanced Regression Methods for Population Health

Course Description: Extension of regression analysis to observational data with unequal variance, unequal sampling and propensity weights, clusters and longitudinal measurements, using different variance structures, mixed linear models, generalized linear models and GEE. Matrix notation will be introduced and underlying mathematical and stats principles will be explained. Examples use data sets from ongoing pop health research.

BMI/POP HLTH 652 Topics in Biostatistics for Epidemiology

Course Description: Each module will adopt an in-depth focus on a biostatistical method of particular relevance to epidemiology such as measurement error, missing data, intermediate variables, complex study designs, meta-analysis, splines, propensity scores, causal inference, spatial statistics and resampling. One or more modules will be offered every spring semester.