BIOSTATISTICS — M.S., M.P.H.

Programs


Courses

STAT 414. Introduction to Biostatistics I. 3 Units.
Introduces statistical methods of summarizing, analyzing, presenting, and interpreting data, with emphasis on health-related data. Topics include normal and binomial distributions, probability, central limit theorem, confidence intervals; as well as hypothesis testing using t-tests, ANOVA, correlation, linear regression, and chi-square. Includes a brief introduction to multivariate analysis. Practice in reading and interpreting statistical summaries in peer-reviewed literature. Emphasizes the practical application of biostatistics. Prerequisite: Competency in introductory level mathematics.

STAT 415. Computer Applications in Biostatistics. 1 Unit.
Uses SPSS to apply appropriate statistical methods in the summary and analysis of health-related data, including descriptive; as well as hypothesis testing using t-tests, correlation, linear regression, chi-square, and ANOVA. Designed to be taken concurrently with STAT 414. Prerequisite or concurrent: STAT 414; or equivalent.

STAT 509. General Statistics. 4 Units.
Introduces statistical methods of summarizing, analyzing, presenting, and interpreting data, with emphasis on health-related data. Topics include normal and binomial distributions, probability, central limit theorem, confidence intervals; as well as hypothesis testing using t-tests, ANOVA, correlation, linear regression, and chi square. Introduces multivariate analysis. Practice in reading and interpreting statistical summaries in peer-reviewed literature. Emphasizes the practical application of biostatistics. Includes extensive laboratory exercises using SPSS. Prerequisite: Competency in introductory level mathematics.

STAT 514. Intermediate Statistics for Health-Science Data. 3 Units.
Selected topics in multiple regression, logistic regression, ANOVA, ANCOVA, and nonparametric tests. Emphasizes understanding, selection, and application of statistical procedures and interpretation of computer output. Prerequisite: STAT 509.

STAT 515. Grant- and Contract-Proposal Writing. 3 Units.
A module-based course that presents an overview of the basic principles and practice in the art and science of successful grantsmanship primarily from a research perspective and a program-based approach. Provides a comprehensive review and understanding of the relevant core structures, stakeholders, processes, factors, and essential skills by engaging students in the actual preparation of a proposal to a funding agency. Demonstrates in a "real world" type practice environment the key elements in proposal development, submission, and the review process—which include identifying potential funding resources (from international, government, and private sectors such as foundations), formulating specific aims or objectives, determining appropriate research or program design and evaluation methods as applicable, and building realistic budget and sustainability plans.

STAT 521. Biostatistics I. 4 Units.
Fundamental concepts in data analysis and statistical inference. Descriptive statistics, probability rules, discrete/continuous probability distributions, sampling distributions, central limit theorem, point/interval estimation for means/proportions, hypothesis testing, one-/two-sample tests, power analysis, ANOVA and multiple comparison procedures, simple regression/correlation, and chi-square tests. Prerequisite or concurrent: STAT 548 or STAT 549; or consent of instructor.

STAT 522. Biostatistics II. 4 Units.
Simple and multiple regression, analysis of the residual, and model building. Multiple and partial correlation. Analysis of variance (fixed-effects model S) with multiple comparisons, including orthogonal contrasts, factorial designs, and analysis of covariance. Power analysis and sample size determination for these models. Prerequisite: STAT 521.

STAT 523. Biostatistics III. 4 Units.
Applies the general linear model to a number of analysis-of-variance, regression, and multivariate procedures, including repeated measures, longitudinal data analysis, and mixed models. Power analysis and sample size determination of these models. Prerequisite: STAT 522.

STAT 525. Applied Multivariate Analysis. 3 Units.
Multivariate normal distribution, discriminant analysis, principal components analysis, factor analysis, and canonical correlation. Emphasizes application of these analyses and interpretation of results. Prerequisite: STAT 522.

STAT 530. Special Topics in Biostatistics. 1-4 Units.
Lecture and discussion on a current topic in biostatistics. May be repeated for a maximum of 4 units applicable to degree program. Prerequisite or concurrent: STAT 509 or STAT 521.

STAT 531. Parametric and Nonparametric Bivariate Statistics. 4 Units.
Focuses on concepts behind the appropriate use of parametric and nonparametric statistical methods. Includes laboratory. Prerequisite: Intermediate graduate level statistics course or consent of instructor.

STAT 532. Applied Bivariate Statistical Analysis. 4 Units.
Brings together other biostatistics classes in a unified, applied, nontheoretical approach. Focuses on using the Statistical Package for the Social Sciences (SPSS) in the analysis of a dataset on the concepts presented in STAT 531. Prerequisite: STAT 531; or consent of instructor.

STAT 533. Applied Multivariable Statistical Analysis. 4 Units.
Explains the different methods of multivariable analyses and other advanced statistical methods, and indicates reasons for choosing one method over another. Final project requires student to perform an appropriate multivariable analysis on a dataset, run appropriate literature review for confounding variables, and present results in a 20-30 minute timeframe using presentation software. Prerequisite: STAT 532; or consent of instructor.

STAT 535. Modern Nonparametric Statistics. 3 Units.
Application and theory of nonparametric methods. One-/two-sample nonparametric tests, k-sample tests, tests for equality of scale parameters, Kolmogorov-Smirnov type tests, tests for ordered alternatives, tests for paired comparisons and block designs, rank/ concordance correlations, chi-square and measures of association, Mantel-Haenszel & McNemar’s tests, permutation and bootstrap methods, smoothing techniques, and semiparametric regressions. Prerequisite: STAT 509 or STAT 521.
STAT 545. Survival Analysis. 3 Units.

STAT 548. Analytical Applications of SAS. 2 Units.
Features of SAS computer package for analysis of statistical data. Includes decisions regarding choice of statistical procedures and interpretation of computer output to answer specific research questions. Prerequisite or concurrent: STAT 509 or STAT 521; or passing score on the computer-competency examination.

STAT 549. Analytical Applications of SPSS. 2 Units.
Features of SPSS computer package for analysis of statistical data. Includes decisions regarding choice of statistical procedures and interpretation of computer output to answer specific research questions. Prerequisite or concurrent: STAT 509 or STAT 521.

STAT 557. Research Data Management. 3 Units.
Basic data and file manipulation using database-management systems for health research. Uses several applications, with emphasis on Microsoft Access. Topics include: importing, exporting, merging, and linking files for a variety of applications; creating, updating, and querying databases; and basic programming, application development, and data entry. General computer skills expected, but no prior computer programming experience necessary. Prerequisite: STAT 509 or STAT 521; STAT 548 or STAT 549.

STAT 564. Survey and Advanced Research Methods. 3 Units.
Principles and procedures of surveys as applied to the health sciences. Topics covered include: survey and research designs, questionnaire construction, validity techniques, sampling methods, sample size determination, minimum effects hypotheses, nonresponse problems, data collection, coding, processing, evaluation, and presentation of results. Presents hands-on experience as a combination of lecture and laboratory activities. Prerequisite or concurrent: STAT 509 or STAT 521.

STAT 568. Data Analysis. 3 Units.
Concepts and applications of the most common data analysis methods: correlation and regression, t-tests, analysis-of-variance, nonparametric methods, and multivariate analyses. Student selects appropriate method of analysis and reporting results. Emphasizes individual analysis of real-data sets. All data analysis assignments to be completed in SPSS. Prerequisite: STAT 514.

STAT 625. Special Topics in Biostatistics. 1-3 Units.
Lecture and discussion on a current topic in biostatistics. May be repeated for a maximum of 6 units applicable to degree program. Recommended for doctoral students. Prerequisite: STAT 521.

STAT 694A. Research. 1 Unit.
Independent statistical research using epidemiologic data. Research program arranged with faculty member(s) involved. Written report and oral presentation required.

STAT 695. Thesis. 2-8 Units.
Student prepares report of individual guided experimental research study in biostatistics, under direct faculty supervision. Limited to graduate students whose thesis projects have been approved by their research committee.