BIOSTATISTICS AND EPIDEMIOLOGY (BSE)

BSE 5001. Problems in Biostatistics and Epidemiology. 1 Credit Hour.
Prerequisites: Concurrent or previous enrollment in BSE 5113 and 5163. Applied problem solving in biostatistics and epidemiology.
Course Type: Laboratory

BSE 5013. Application of Microcomputers to Data Analysis. 3 Credit Hours.
Prerequisites: BSE 5163 or permission of the instructor. Introduction to the use of data management and processing equipment and 1 package (SAS) readily available on this campus. Storage, manipulation, and retrieval of data and statistical summaries are emphasized.
Course Type: Lecture

BSE 5023. Computer Applications in Public Health. 3 Credit Hours.
Prerequisites: BSE 5163 or Permission of Instructor. Application of currently available hardware and software to common problems encountered in Public Health practice.
Course Type: Lecture

BSE 5033. Foundations and Overview of Public Health. 3 Credit Hours.
Prerequisites: None This course will provide an overview of public health for students in MS or doctoral programs, who have not completed the MPH core courses prior to enrollment in their graduate program.
Course Type: Lecture

BSE 5111. Scientific Integrity in Research. 1 Credit Hour.
Prerequisites: None This course is designed to provide training to M.S. and Ph.D. students in Biostatistics and Epidemiology in the responsible conduct of research, scientific integrity, and the protection of human research subjects. The class will cover issues related to: 1) acquisition, management, sharing, and ownership of data; 2) conflict of interest and commitment; 3) human subjects protection; 4) research misconduct; 5) publication practices and responsible authorship; 6) peer review; and 7) collaborative science. The course is to be completed prior to initiation of thesis or dissertation research.
Course Type: Lecture

BSE 5113. Principles of Epidemiology. 3 Credit Hours.
Prerequisites: None. This course provides an introduction to epidemiology for students majoring in any aspects of Public Health. The principles and methods of epidemiology investigation, both of infectious and non-infectious diseases are discussed.
Course Type: Lecture

BSE 5153. Clinical Trials. 3 Credit Hours.
Prerequisites: Basic Statistics and Epidemiology or permission of instructor. Principles for the design and conduct of clinical trials are discussed. Emphasis will be given to protocol preparation, randomization, sample size, trial monitoring, ethical issues and data analysis.
Course Type: Lecture

BSE 5163. Biostatistical Methods I. 3 Credit Hours.
Prerequisites: College algebra and ability to use computer spreadsheet or instructor permission. Students who seek late enrollment in the course must obtain instructor permission to enroll. Fundamental concepts and applications of statistics. This course and BSE 5173 serve as an introduction to all higher level courses in statistics. This course makes use of the JMP statistical package. (F I, SU II)
Course Type: Lecture

BSE 5173. Biostatistics Methods II. 3 Credit Hours.
Prerequisites: BSE 5163 and BSE 5013. More complex forms of the analysis of variance are present. The fundamental aspects of experimental design as well as covariance, multiple regression, curvilinear regression, and the binomial and poisson distribution are discussed.
Course Type: Lecture

BSE 5183. Intermediate Biostatistical Methods for Health Professionals. 3 Credit Hours.
Prerequisites: BSE 5163 or permission of instructor. This course provides an overview of frequency, analysis of variance, and regression methods. Students will determine the appropriate statistical approach to answer health-related research questions, review assumptions underlying specific approaches, and perform and interpret output from analyses completed using statistical software. This course uses the JMP statistical package. (Sp I, II)
Course Type: Lecture

BSE 5193. Intermediate Epidemiologic Methods. 3 Credit Hours.
Prerequisites: BSE 5113 or equivalent Methodological issues important to the design of epidemiologic studies of both infectious and non-infectious disease. Topics include formulation of a research question, types of studies, sample size, sampling methods, biases and confounding, data collection instruments and the presentation and interpretation of data.
Course Type: Lecture

BSE 5253. Introduction to Occupational and Environmental Epidemiology. 3 Credit Hours.
Prerequisites: BSE 5113 and BSE 5163 or equivalent. Methodologic issues and approaches used in occupational and environmental risk assessment studies will be presented. These include study design, assessment of exposures, ascertainment of outcomes, methods of analysis and sources of data. Examples of classic occupational and environmental studies will be presented and implications for health policy will be discussed.
Course Type: Lecture

BSE 5283. GIS in Health. 3 Credit Hours.
Prerequisites: BSE 5163, BSE 5113, and permission of instructor The goal of this course is to familiarize students with applications of Geographic Information Systems (GIS) in Public Health. Topics include a basic understanding of using geodatabases, geocoding, producing effective disease maps, visualization, classification, and accuracy assessment. Students will be able to produce effective infectious disease and cancer cluster maps.
Course Type: Lecture

BSE 5303. Epidemiology of Infectious Disease. 3 Credit Hours.
Prerequisites: BSE 5113. Intended for epidemiology majors. Lectures and laboratory sessions devoted to the study of factors common to all infectious diseases as well as studies of specific disease.
Course Type: Lecture

BSE 5333. Introduction to Emerging Infections and Bioterrorism. 3 Credit Hours.
Prerequisites: BSE 5113 Principles of Epidemiology. The course will introduce students to a wide variety of topics relating to emerging infections and bioterrorism. The course will first provide an overview of emerging diseases and the factors associated with their appearance. Second, the course will examine bioterrorism, its agents, history, potential impact and discuss public health preparedness.
Course Type: Lecture

BSE 5343. Methods in Infectious Disease Epidemiology. 3 Credit Hours.
Prerequisites: BSE 5113; BSE 5303; or authorization from the instructor. This course aims at covering methods applicable to the design and conduct of epidemiological studies specific to infectious diseases.
Course Type: Lecture

BSE 5363. Epidemiology and Prevention of Chronic Diseases. 3 Credit Hours.
Prerequisites: BSE 5113; BSE 5163; BSE 5193 or BSE 5001 This course is a survey of chronic diseases and the epidemiologic methods used to study them. Students are expected to read and report on the literature and to use descriptive statistics on survey data of chronic disease risk factors.
Course Type: Lecture

BSE 5403. Social Epidemiology. 3 Credit Hours.
Prerequisites: BSE 5113 (Principles of Epidemiology) and BSE 5163 (Biostatistics Methods I) or permission of the instructor. The purpose of this course is to provide students with both the information and experience to identify social determinants of health outcomes in populations. Students will develop an understanding of the general concepts of social epidemiology and develop their own critical assessment of how social factors impact health outcomes and the development of disease. Students will participate in class discussions, read relevant materials, and conduct and report on a community assessment project.
Course Type: Lecture

BSE 5603. Sampling Theory and Methods. 3 Credit Hours.
Prerequisites: BSE 5163 and permission of Instructor. To introduce various commonly used sampling methods including when and how to apply them, advantages and disadvantages, how to determine sample size, and the design of forms and questionnaires for data collection.
Course Type: Lecture

BSE 5633. Public Health Strategies for Tobacco Control. 3 Credit Hours.
Prerequisites: BSE 5113, BSE 5163, HPS 5213, HAP 5453, OEH 5013 or permission of the instructor Multi-Level Course: CPH 7633 This course provides an overview of the history, health effects, politics, and prevention of tobacco use, examining the issue from all perspectives: epidemiological, psychosocial, political, economic and environmental. Students will explore the multidimensional aspects of tobacco use and the research and metholodology contributing to best practices in tobacco control.
Course Type: Lecture

BSE 5643. Regression Analysis. 3 Credit Hours.
Prerequisites: BSE 5163 and 5013. Multiple linear regression analysis, including polynomial regression, indicator variables, and covariance analysis are covered. Also covered are : tests of hypotheses and interval estimates, model selection and validation; methods for measurement errors, diagnostic methods for outliers, influence, and multicollinearity; nonlinear regression, logistic regression with non-normal distributions; and time-series analysis and forecasting. Applications are drawn from public health.
Course Type: Lecture

BSE 5653. Nonparametric Methods. 3 Credit Hours.
Prerequisites: BSE 5013; BSE 5163; one of the following: BSE 5173 or BSE 5643 or BSE 5663 Modern techniques of nonparametric analysis applied to single and multiple samples, including approaches based on signed- and ranked-transformed data and on permutation tests. Discussion of exact results and large sample approximations. Nonparametric analysis of categorical data summarized in contingency tables. Nonparametric bootstrapping. Introduction to robust regression. Analysis of qualitative data as it applies to experimental design in biology and medicine. Discussion of the binomial and chi square tests as well as rank based and distribution free methods to the k-sample case and nonparametric measures of correlation and association. Analysis of variance of ranked data is included.
Course Type: Lecture

BSE 5663. Analysis of Frequency Data. 3 Credit Hours.
Prerequisites: BSE 5163 and 5013. Tests and measures of association for contingency table analysis; partitioning chi-square; the odds ratio; comparative trials; analysis of categorical data with matched samples; combining evidence from contingency tables; effects and controls of misclassification errors; and multiway contingency tables are covered in this course.
Course Type: Lecture

BSE 5703. Principles of the Theory of Probability. 3 Credit Hours.
Prerequisites: Permission of Instructor. Introduction to the principles to the theory of probability. Primarily for the student who plans to major in the field of statistics.
Course Type: Lecture

BSE 5733. Principles of Mathematical Statistics I. 3 Credit Hours.
Prerequisites: BSE 5703 and Differential and Integral Calculus. An introduction to mathematical statistics and the theory of statistical inference. The theory of distributions including sampling distributions, multivariate distributions and approximations to distributions.
Course Type: Lecture

BSE 5743. Principles of Mathematical Statistics II. 3 Credit Hours.
Prerequisites: BSE 5733. Law of large numbers, estimation of parameters, central limit theorem, confidence intervals and tests of hypotheses. Regression, sampling from a normal population, experimental design, analysis of variance, and distribution free methods.
Course Type: Lecture

BSE 5763. Applied Bayesian Statistics. 3 Credit Hours.
Prerequisites: BSE 5163 Biostatistics Methods I and at least one of the following: BSE 5173 Biostatistics Methods II or BSE 5643 Regression Analysis or BSE 5663 Analysis of frequency data or BSE 6563 Longitudinal Data Analysis.
Course Type: Lecture

BSE 5803. Epidemiology and Prevention of Diabetes. 3 Credit Hours.
Prerequisites: BSE 5113, BSE 5163, and BSE 5363; or permission of instructor. Students gain knowledge of diabetes through application of epidemiologic principles and methods. Topics to be covered include types of diabetes and diagnostic and classification criteria, prevalence, incidence and costs of diabetes in the U.S. and other countries, risk factors, diabetic complications, and prevention strategies for diabetes and its complications.
Course Type: Lecture

BSE 5960. Directed Readings in Biostatistics and Epidemiology. 1-6 Credit Hours.
Prerequisites: Permission. May be repeated with change of content; maximum credit 6 hours. Offers the student the opportunity to explore with faculty guidance, areas of interest in biostatistics or epidemiology not specifically incorporated in formal courses.
Course Type: Independent Study

BSE 5980. Research for Master's Thesis. 1-4 Credit Hours.
Prerequisites: Permission. May be repeated; maximum credit 4 hours.
Course Type: Independent Study

BSE 5990. Special Studies. 1-3 Credit Hours.
Prerequisites: Permission of Instructor. May be repeated; maximum credit 3 hours. Topics of a special nature or of unusual interest to students. Deals with a specific topic, area or problem, which is not adequately covered in the current curriculum, as judged by the training needs of the students.
Course Type: Independent Study

BSE 6151. Applied Statistical Methods for Clinical Trials. 1 Credit Hour.
Prerequisites: BSE 5163, BSE 5153 (or concurrent enrollment), BSE 5013 This course is designed to introduce the student to practical applications of statistical methods in clinical trials.
Course Type: Lecture

BSE 6192. Grant Writing Skills in Epidemiology. 2 Credit Hours.
Prerequisites: BSE 5303, BSE 5363, BSE 5193. Problems encountered in the design and execution of epidemiologic field studies in human populations. Students will be required to design a field study for a specific disease and prepare a scientific protocol and emphasis will be placed on grantsmanship.
Course Type: Lecture

BSE 6193. Methods in Clinical Epidemiology. 3 Credit Hours.
Prerequisites: BSE 5013, BSE 5163, BSE 5113, BSE 5193 and at least one of the following: BSE 5663, BSE 5173 or BSE 6643. This course focuses on quantitative methods used in the design and conduct of clinical epidemiologic studies. Emphasis will be placed on differentiating among diagnostic, prognostic and etiologic/intervention research, selecting analytical methods, Identification and avoidance of common biases, and critical evaluation of existing literature.
Course Type: Lecture

BSE 6194. Advanced Epidemiologic Methods. 4 Credit Hours.
Prerequisites: Principles of Epidemiology and Introductory course in Biostatistics This course will cover, in depth, the design of epidemiologic studies, practical and theoretical considerations, biases, confounding and misclassification, concept of cause and causal models. Examples from the literature will be evaluated and methods of analysis presented.
Course Type: Lecture

BSE 6233. Reproductive and Perinatal Epidemiology. 3 Credit Hours.
Prerequisites: BSE 5113 Principles of Epidemiology & BSE 5163 Biostatistics Methods I This course provides an overview of the epidemiology of major reproductive and prenatal health endpoints including infertility, fetal loss, birth weight, congenital malformations and infant mortality. Current knowledge of the determinants of these outcomes is introduced with emphasis on metholodologic considerations specific to the study of reproductive and prenatal health.
Course Type: Lecture

BSE 6323. Molecular and Genetic Epidemiology. 3 Credit Hours.
A description of the use of human genetics and molecular biology in studying host susceptibility to disease. Includes a background review of mendelian genetics and single gene defects as well as methodologies currently being used in the laboratory and their application to epidemiologic studies of multifactorial disease.
Course Type: Lecture

BSE 6353. Epidemiology of Cardiovascular Disease. 3 Credit Hours.
Prerequisites: BSE 5113, BSE 5363 or Permission. The course includes a detailed review of the epidemiology of the major cardiovascular diseases including natural history, prevention, and treatment. Major cardiovascular studies are reviewed.
Course Type: Lecture

BSE 6363. Cancer Epidemiology and Prevention. 3 Credit Hours.
Prerequisites: BSE 5363 and BSE 6323. A detailed review of epidemiologic aspects and prevention strategies for the major cancer sites is presented. Emphasis will be placed on the causes, prevention, early detection and control of cancer.
Course Type: Lecture

BSE 6553. Linear Models I. 3 Credit Hours.
Prerequisites: BSE 5563, BSE 5743. The theoretical development of analytic methods for the analysis of data conforming to linear models with a review of basic mathematical statistics, an introduction to linear models and their classifications, the general linear model of full rank, curvilinear models and model of functional relationships.
Course Type: Lecture

BSE 6563. Longitudinal Data Analysis. 3 Credit Hours.
Prerequisites: BSE 5163 Biostat. Methods I; BSE 5013 Microcomputer Applic. Data Analysis; BSE 5173 Biostatistics Methods II. The course focuses on data that are correlated in time, space, or through an inherent hierarchical structure. Applications for continuous outcomes include repeated measures, mixed, random coefficient, and hierarchical models. Applications for categorical outcomes include general estimating equations and generalized linear mixed models.
Course Type: Lecture

BSE 6643. Survival Data Analysis. 3 Credit Hours.
Prerequisites: BSE 5163 and 5013 and either BSE 5663 or BSE 5653, or by permission of the instructor. Discussion of statistical methods for the analysis of clinical and laboratory data related to survival. Special attention is given to data from experimental animals and human patients with acute diseases, for example, cancer.
Course Type: Lecture

BSE 6663. Analysis of Multivariate Data. 3 Credit Hours.
Prerequisites: BSE 5173, BSE 5663 or Permission of Instructor. The development and application of the statistical techniques which are currently used for description, estimation, and hypothesis testing of multivariate data collected in medical or health related studies. Use of computer programs which perform these techniques and of programs which can be combined to perform these techniques will be emphasized.
Course Type: Lecture

BSE 6950. Research in Biostatistics and Epidemiology. 1-4 Credit Hours.
Prerequisites: Permission. May be repeated; maximum credit 4 hours. Open only to advanced students to engage in supervised research into Biostatistics or Epidemiology.
Course Type: Independent Study

BSE 6960. Directed Readings. 1-4 Credit Hours.
Prerequisites: None May be repeated with change of content; maximum credit 4 hours. Intensive directed readings in a specific area of interest.
Course Type: Independent Study

BSE 6980. Research for Doctoral Dissertation. 1-16 Credit Hours.
Prerequisites: Permission. May be repeated; maximum credit 16 hours. Credit hours vary
Course Type: Independent Study

BSE 7103. Introduction to Biostatistics. 3 Credit Hours.
Prerequisites: Ability to use a computer. Either earn a grade of B or better in college algebra or a more advanced mathematics course(course must have been taken no more than six years prior to admission, or score at or above the 50th percentile on the quantitative portion of either the GMAT or the GRE, or score 500 or better on the mathematics specialized exam of the GRE. A broad introduction to the concepts underlying biostatistical methods.
Course Type: Lecture