MASTER OF SCIENCE IN EPIDEMIOLOGY PROGRAM
COURSE DESCRIPTIONS

BIOE 800—Master's Thesis and Research

This course involves research and development of the thesis required for the Master's degree. Credit: By arrangement.

BIOE 804—Master's Project

Independent study in a community-health topic selected in conjunction with project advisor. Oral and written reports required, including oral presentation and defense of project. Course enrollment is restricted to those students in the community-medicine track with project option for the M.S. in Epidemiology. Prerequisite: consent of the project advisor. Credit: By arrangement.

BIOE 810—Independent Study

This course involves an in-depth study of some aspect of epidemiology in which the student has special interest. Study is done independently with faculty approval and supervision. Prerequisite: Permission of instructor. Credit: Variable.

BIOE 811—Biostatistics for the Health Sciences I

The first semester material includes descriptive statistics, estimation, and one and two sample hypothesis testing, including paired and unpaired situations. Instruction includes assisting the student to attain mastery-level skill in data entry and use of SAS software system for statistical analysis of data on the UT VAX. Credit: 3.

BIOE 812—Fundamentals of Epidemiology (Introduction to Epidemiology)

This course introduces the basic principles and methods of epidemiology and demonstrates their applicability in the field of public health. Topics to be covered include the historical perspective of epidemiology, measures of disease occurrence and of association, clinical epidemiology, disease screening, causal inference, and study design. Credit: 3.

BIOE 813—Fundamentals of SAS for Epidemiology

This course provides the foundation computing skills for independent analysis of epidemiologic data. Topics to be covered include an introduction to SAS as a research tool; SAS programming concepts; data preparation for SAS; getting data into SAS from other programs; elementary SAS Data Step programming; combining datasets; an introduction to SAS procedures--especially those that produce descriptive statistics; performing simple inferential tests or creating datasets; recoding and labeling within SAS; handling character data; and advanced Data Step programming. The course includes a mandatory SAS computing laboratory. Limited to 12 students. Consent of the instructor required. Credit: 2.

BIOE 814—Health Behavior Theory & Intervention Design

Understanding health behavior and community approaches to health promotion is vital to designing public health interventions to reduce behavioral risk factors and to increase health care utilization. This course provides students the opportunity to learn major theories of individual behavior such as reasoned action, health belief models, and social learning, as well as community approaches such as media advocacy, social marketing, and community organization and to apply these theories to designing community interventions. Credit: 3.

BIOE 815—Introduction to Public Health & Preventive Medicine

This course introduces students to the identification, understanding, and application of preventive and public health approaches to the wide range of infectious diseases and chronic disease epidemics. Prerequisites: BIOE 811 and BIOE 812, or consent of program director. Credit: 3.

BIOE 816—Epidemiologic & Clinical Methods in Bone Assessment

This course provides the basic scientific principles necessary for proposing, evaluating, or undertaking research in the area of bone metabolism. Topics to be covered include the natural history of bone mass; fracture epidemiology and risk assessment; treatment and prevention of osteoporosis; basic principles of bone biology and mineral metabolism; methods of bone assessment including ultrasound, x-ray absorptiometry, quantitative computed tomography, and magnetic resonance image for clinical and epidemiological research; and biochemical markers of bone metabolism. Also included will be in-depth discussion of quality assurance programs and data management issues pertinent for bone-related research protocols and clinical assessment of bone metabolism. Credit: 3.

BIOE 817—Epidemiology of Aging

This course provides an epidemiological perspective on the health of older people in the American population. Major topics include population factors and trends related to aging, health risks and aging, and epidemiological research concepts and methods in aging. Credit: 3.

BIOE 818—Mixed Linear Models in Epidemiology

This course provides the advanced skills necessary for independent statistical analysis of epidemiologic and clinical data containing clustered observations and random effects. Topics to be covered include unrestricted and restricted maximum likelihood estimation, Akaike's information criterion, standard general linear models, linear random effects models, linear covariance pattern models, and linear random coefficient models. The course focuses on applications requiring flexible modeling of variance and covariance structures for clustered data when observations from a common cluster are correlated. The approaches covered in the course are particularly relevant for analysis of hierarchical and longitudinal data having Gaussian distributed error. Prerequisites: BIOE 821 and BIOE 822. Credit: 3.

BIOE 819—Master's Seminar

The Master's Seminar is designed to expose students to a wide variety of topics of professional relevance including discussions on current work in the field, presentations on specific topic areas within epidemiology, the use of tools important to epidemiologic research, and presentations of ongoing Master's research. Credit: 1.

BIOE 820—Master's Seminar on Clinical Research in Special Populations

This course will expose students to issues pertaining to clinical research in special populations including children, pregnant women, normal healthy subjects, and groups that may include international participants. Existing federal and international guidelines and the medical literature will be used in this course. Course grading will be pass/fail. Credit: 1.

BIOE 821—Biostatistics for the Health Sciences II

The second semester content pertains to methods of regression for observational and experimental data. Methods of analysis and hypothesis testing for three or more treatments are presented for various experimental designs and treatment combinations for normally distributed and ordinal data. Instruction includes helping the students attain mastery-level skill in programming with the SAS software system for statistical analysis of data on the UT VAX. Credit: 3.

BIOE 822—Advanced Epidemiology

This course provides the foundation skills for independent analysis of epidemiologic data. Topics to be covered include the analysis of vital statistics data, statistical analysis of simple epidemiologic measures, identification and control of confounding in epidemiologic data, model building using epidemiologic data, logistic regression, and proportional hazards modeling. At the end of the semester, students will be able to analyze data from matched and unmatched case-control studies, case cohort studies, and traditional cohort designs. The course includes a mandatory statistical computing laboratory. Prerequisites: BIOE 811 and BIOE 812. Credit: 4.

BIOE 823—Randomized Clinical Trials (Intervention Trials)

This course will allow the student to understand and analyze the many critical facets of the most precise design for clinical studies in humans: randomized clinical trials. Using a case-based approach, students will learn the importance of precise hypothesis description, selection of an at-risk cohort for study, and the power of randomization in helping balance the study groups on a number of known and unknown confounding factors. Important issues with regard to subject recruitment, patient management, and data quality control will be emphasized. Students will learn to perform their own sample size calculations and use actual statistical packages to outline real clinical trial results data. Prerequisites: BIOE 811 and BIOE 812. Credit: 3.

BIOE 824—Genetic Epidemiology: Methods and Applications

This course provides the concepts and methods of genetic epidemiology that are relevant to studying the causes of complex human diseases and the impact of human genetic variation on disease prevention and treatment. The course includes methods of population- and family-based studies of genotype-phenotype associations; statistical techniques related to segregation analysis; linkage analysis and transmission disequilibrium test (TDT); approaches for assessing gene-gene and/or gene-environment interaction; and procedures for evaluating ethical, legal, and social issues, and public health implications of research and interventions. Emphasis is placed on distinguishing the appropriate applications, underlying assumptions, and reasonable interpretations of the methods presented. Prerequisites: BIOE 821 and BIOE 822 or their equivalents. Credit: 3.

BIOE 825—Bioinformatics for Epidemiologists

This course will describe concepts and methods in bioinformatics in application to the needs of an epidemiologist. After providing an overview of concepts in molecular biology, genetics, and molecular evolution, this course will cover various methods of computational genetic analysis and available databases and software resources. Students will learn about DNA and protein sequence analysis, gene mapping, phylogenetic analysis, molecular biology databases and software packages, expression data analysis, and protein analysis resources. Prerequisite: BIOE 824. Credit: 1.

BIOE 826—Women's Health Seminar

This course will include review and discussion of recent trends and current topics in women's health on the national scene. This information, along with an introduction to community diagnosis methods, will be used to prioritize women's health issues of local interest for student projects. Students will analyze locally available data to conduct a community needs assessment in the area of women's health in Memphis. Results of the analysis will be presented to the class in a podium-style presentation. Classroom discussion of the results of the analyses will culminate in creating of a plan for action steps and policy changes needed to improve the health of women in Memphis. The action steps and policy changes will be included in a written report suitable for publication. Credit: 3 (3-0).

BIOE 827—Introduction to Patient-Oriented Research

This course will present the different types of patient-oriented research, including observational cohort studies, case-control studies, and Phase I-IV intervention-based clinical trials. Attention to design issues, practical conduct, and analytic considerations for each will be reviewed. This course will also examine the ethical issues in research and will review the evolution of federal guidance for conduct of research. Credit: 3 (3-0).

BIOE 831—Measurement in Epidemiology

This course is an introduction to measurement methods in epidemiology, including consideration of measurement error and accuracy, reliability and validity, and response rates. Prerequisites: BIOE 811 and BIOE 812. Credit: 3.

BIOE 832—Implementing Change in Healthcare Organizations

This course provides evidence-based guidelines for improving the implementation of change in healthcare organizations. Epidemiological research prescribes and assesses interventions for improving medical care that can necessitate changes in organizational routines and procedures. For example, interventions may involve a change in clinicians' practices; this is an instance of implementing change in a healthcare organization. However, when hospitals and other healthcare organizations introduce new clinical practices, these efforts all too frequently result in poor compliance and incomplete implementation. Understanding the barriers to change (and how to overcome them) may assist clinical investigators in analyzing why some interventions fail due to lack of compliance, while other similar interventions succeed. Drawing on organizational theory and health services research, this course will analyze some of the barriers to implementing change and present some methods for reducing the resistance to change. Credit: 2.

BIOE 834—Epidemiology of Childhood Diseases

This course will provide an overview of the epidemiology of selected conditions and diseases affecting children as well as demonstrate the childhood origins of some adult chronic disease. For most of these conditions, information about the pattern of occurrence, data about risk factors and effectiveness of various preventive or therapeutic interventions will be discussed. Public use sources of information such as the National Health and Examination Survey (NHANES), National Ambulatory Medical Care Survey (NAMCS), CDC "Pink Book," Child and Adolescent Health Measurement Initiative (CAHMI), and Youth Risk Behavior Surveillance System (YRBSS) will be introduced and discussed. Additionally, some of the unique and challenging aspects of research in pediatric epidemiology such as issues of childhood growth and development, maternal (intrauterine)

origins of disease and parental role in disease diagnosis and treatment will be introduced. In the last weeks of the course, students will be asked to synthesize the information presented in the course by identifying, presenting, and evaluating the available epidemiological information on a childhood disease or condition of their choice. Prerequisite: BIOE 812 unless waived by the instructor. Credit: 1.

BIOE 840—Special Topics

This course involves directed readings or special course in topics of current interest. Students must have signed approval from the sponsoring faculty member before registering. Credit: Variable (1-5).

BIOE 851—Introduction to Health Services Research

This course will review key research studies related to the delivery and financing of health care services. Topics to be studied will center on research topics that have had significant influence on national health care policy. These include the role of research in policy formulation, health care financing and cost control, health manpower planning, local variations in health care practice, physician payment systems, access to care, measuring quality of care, alternative delivery systems, and technology assessment. Emphasis will be on study methodology and on policy implications of research data. Prerequisites: Simultanous registration in BIOE 812 or consent of course director. Credit: 3.

BIOE 861—Pharmacoepidemiology

This course provides the fundamentals for studying the frequency and determinants of unintended, unexpected, and expected effects of drugs. Postmarketing studies of the patterns of medication utilization, cost-effectiveness analyses, and investigation of the distribution of diseases possibly amenable to medical intervention represent important additional themes. The course focuses on both theoretical principles and their practical application. Prerequisites: BIOE 811 and BIOE 812. Credit: 3.

BIOE 862—Advanced Categorical Data Techniques for Epidemiology

This course begins by examining the sampling models and the associated distributions that are most closely identified with categorical data. Next are reviewed the most common chi-square tests and measure of association for standard contingency tables or sets of stratified contingency tables. The generalized linear model is introduced as the backbone for building models that focus on the estimation of effects, model inference and model checking. Specific topics for the modeling of categorical data include logistic regression for dichotomous and polytomous response, conditional logistic regression, generalized estimating equations, and generalized linear mixed modeling for models with random effects. In addition, the course will explore loglinear modeling for count data and life estimation and Cox proportional hazards model for categorized time to event data. The relation of the various approaches and procedures using SAS will be demonstrated. The course focuses on application of the above approaches to observational and clinical trial data sets. Prerequisites: BIOE 812 and BIOE 821. Credit: 3.

--ELECTIVE COURSES from the University of Memphis--

The following elective courses may be offered through the joint reciprocal agreement between the University of Tennessee Health Science Center and the University of Memphis. Course availability and descriptions are subject to change, so students should consult the latest edition of the University of Memphis Graduate School catalog. Students should also consult their

UTHSC program director about permission and procedures for taking an elective graduate course at the University of Memphis.

ANTH 7511—Anthropology of Health Care

Roles of the various health professions in the delivery of medical care with emphasis on the perception of these roles by racial or ethnic groups in the Mid-South. Lectures by medical professionals and administrators. PREREQUISITE: Non-majors must have permission of instructor. Credit: 3.

ANTH 7521—Biocultural Epidemiology

Concepts and research uniting epidemiology and medical anthropology; explores epidemiologic web of agent, host, and environment in disease; stresses interplay of sociocultural, behavioral, and environmental risk factors; examines applications of epidemiology theory and methods to medical anthropology and global health policy. Credit: 3.

ENGL 7808—Workshop: Scientific and Technical Writing

Textual and contextual analysis of the kinds of writing produced most often in industry and the academic research community; practice in writing documents such as technical proposals, reports, computer documentation, and papers for publication. Credit: 3. [A special section of this course may be available for UTHSC students; if so, it would be listed in the Courses section of the UTHSC College of Graduate Health Sciences website, as a College-wide elective course offering for a particular semester.]

HPRO 7182—Health Promotion (also may be listed as FITW 7182)

Development of health promotion programs in community and corporate settings, including assessment of program development, selection of personnel, administrative procedures, evaluation procedures, marketing techniques, and legal issues. Credit: 3.

GEOG 6502—Computer Mapping (Computer Cartography; same as PLAN 6502)

Instruction in use of computer mapping programs as effective techniques for visual presentation of a wide variety of data. *Two lecture, two laboratory hours per week.* Credit: 3.

HADM 7101—Health Systems (U of M may list as HADM 6101; POLS 7-8621, HADM 7-8101)

Analysis of health and medical care systems with reference to public, private, and voluntary agencies at local, state, regional, and national levels orient administrators to health and medical care systems with which they may work. Credit: 3.

HADM 7107—Health Care Ethics

Overview of ethical theory and its relationship to individual and community health; discusses critical issues, including beginning of life, end of life, medical research, access to care, and justice; emphasizes the critical decision making of individuals and how ethical thinking might inform public policy. Credit: 3.

HADM 7115—Public Health Systems

Introduction to analysis of public health systems in the US: examines inner mechanisms of public health system; analyzes relationships between public and private healthcare delivery

systems; reviews public health system's roles, themes, and paradigms to improve systems; explores future challenges. Credit: 3.

HADM 7206—Managerial Epidemiology

Introduction to principles and tools of epidemiology, exploring distribution and determinants of disease, and examining ways to apply this knowledge to the management of health service organizations. Credit: 3.

PSYC 7307—Models of Program Evaluation

History and nature of program evaluation, review of different approaches taken to evaluation by variety of major theorists in the field; practice in evaluation. Credit: 3.

SOCI 7851—Medical Sociology

Social meaning of disease, with special emphasis on the cultural, organizational, and behavioral contexts of the occurrence and management of disease. Credit: 3.