

## Graduate Course Offerings - Biosocial Training Program

Course	Instructor	Description
<b>Biological/Health Sciences</b>		
EPID 742* Biomarkers in Population-Based Research	Stephanie Engel	This course surveys the major issues relevant to the application of biomarkers in epidemiological research, including the logistical hurdles in biospecimen collection and storage, assessments of biomarker quality, analytic issues, and the interpretation of quantitative estimates. (2 credits)
EPID 743: Genetic epidemiology: methods and applications	Kari North	Concepts and methods of genetic epidemiology relevant to study of complex human diseases, including segregation analysis, linkage analysis, and gene-environment interaction. Includes whole genome approaches, as well as non-human systems. (3 credits)
BIOS 781: Introduction to Statistical Genetics	Fei Zou	An introduction to statistical procedures in human genetics, Hardy-Weinberg equilibrium, linkage analysis (including use of genetic software packages), linkage disequilibrium and allelic association (4 credits)
GNET 647: Human Genetics and Genomics	Karen Mohlke, Samir Kelada	The course covers principles and modern approaches of human genetics and genomics, including human genetic variation, linkage, genome-wide association analysis, sequencing for variant discovery in monogenic and complex diseases, regulatory variation, the molecular basis of human disease, and functional validation of disease variants. (1 credit)
BIOL / GENT 621: Advanced Genetic Analysis	Jeff Sekelsky, Greg Copenhaver, Shawn Ahmed	Intended to provide an intensive introduction to modern genetic analysis based on classical and contemporary paradigms, drawing on examples from a wide range of model organisms. (3 credits)
BIOL 427: Human Diversity and Population Genetics	Corbin Jones	This course investigates the facts, methods, and theories behind human population genetics, evolution, and diversity. Specifically, it addresses questions of human origins, population structure, and genetic diversity. (3 credits)
SOCI 950: Society, Population, and Genomics	Guang Guo	Topics include an introduction to biometrics (inferring genetic influences using genetically related individuals); an introduction to basic principles of molecular genetics; joint influences of social contexts and genetic heritage to human behaviors; history of human evolution and contemporary race/ethnicity; evolutionary psychology; sex, gender, and genetics; ethical, legal, and social issues in genetic studies; genetic testing; and epigenetics - the potential links between genes and environment. (3 credits)
EPID 742* Biomarkers in Population-Based Research	Stephanie Engel	This course surveys the major issues relevant to the application of biomarkers in epidemiological research, including the logistical hurdles in biospecimen collection and storage, assessments of biomarker quality, analytic issues, and the interpretation of quantitative estimates. (2 credits)
EPID 735: Cardiovascular Epidemiology	Laura Loehr, Wayne Rosamond	Review of cardiovascular health and disease in populations and their population determinants. Topics include epidemiologic methods, risk factors, strategies for prevention, and a student research project.(3 credits)
PATH 767: Molecular and Cellular Biology of Cardiovascular Diseases	Jonathon W. Homeister, Christopher P. Mack	This advanced course will explore the underlying pathogenesis of clinical cardiac and vascular disease with the objective of teaching students to understand, investigate, and communicate current concepts of cardiovascular disease. Study topics include hypertension, lipid metabolism and atherosclerosis, metabolic syndrome, myocardial injury, heart failure, angiogenesis, thrombosis and thrombolysis, genetics and epidemiology of cardiovascular disease, and others. (3 credits)
MHCH 611/NUTR 611: Nutrition across the Life Cycle	Anna Maria Siega-Riz, Carmen Samuel Hodge, Amanda Holliday	This course covers nutrition during the life cycle. Units include women during preconception, pregnancy, and lactation; infancy; childhood; adolescence; and older adults (65+). Nutrient and energy needs, assessment of nutritional status, and cultural and socioeconomic barriers are discussed for each phase. (3 credits)

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EPID 814/NUTR 814: Obesity Epidemiology	June Stevens, Patrick Bradshaw	Examines epidemiologic research on the causes, consequences, and prevention of obesity. Emphasis on methodologic issues pertinent to obesity research. (3 credits)
NUTR 812: Introduction to Obesity: From Cell to Society	Saroja Voruganti, Jennifer Poti	This is an interdisciplinary course focused on population and laboratory based research on obesity, including international and national trends in obesity, its determinants, and consequences. The course will provide a broad survey of obesity research, including measurement issues, biological, social and economic etiologies, health and economic consequences, and prevention and treatment of obesity. (3 credits)
NUTR 863: Advanced Nutritional Biochemistry: Microenvironments: Inflammation in Obesity, Atherosclerosis and Cancer	Liza Makowski	Will examine the interaction of cells in the microenvironment and recent advances in the role of metabolism and inflammation. (2 credits)
EPID 889: Population Burden Measures in Cardiovascular Disease Epidemiology EPID 742* Biomarkers in Population-Based Research	Christy Avery  Stephanie Engel	This course will provide students with a practical knowledge of disease burden metrics that can serve as a substitute or companion to traditionally reported ratio measures. Although this course will use examples from the cardiovascular disease literature, the concepts presented are applicable to a broad range of topical areas. (1 credit)  This course surveys the major issues relevant to the application of biomarkers in epidemiological research, including the logistical hurdles in biospecimen collection and storage, assessments of biomarker quality, analytic issues, and the interpretation of quantitative estimates. (2 credits)
EPID 751: Emerging and Re-Emerging Infectious Diseases	Lola Stamm	Basic principles of infectious diseases, focusing on emerging and re-emerging disease agents that affect public health. Includes an introduction to the biology of viruses, bacteria, and eukaryotic parasites. (4 credits)
EPID 755: Introduction to Infectious Disease Epidemiology	Audrey Pettifor, Steve Meshnick	Objectives of the course are to: (1) understand the general principles of infectious disease epidemiology, (2) understand surveillance, prevention and control of infectious diseases, and (3) apply principles to specific infectious diseases. (3 credits)
NUTR 861: Advanced Nutritional Biochemistry: Nutrition and Immunology	Melinda Beck	Presents an understanding of basic immunology and the role of nutrition in modifying the immune response. (2 credits)
BIOL 449 Introduction to Immunology	Lorraine Cramer	This course provides a general overview of the evolution, organization, and function of the immune system. Instruction will be inquiry-based with extensive use of informational and instructional technology tools. (3 credits) Offered in summer and during school year.
NUTR 812: Introduction to Obesity: From Cell to Society	Saroja Voruganti, Jennifer Poti	This is an interdisciplinary course focused on population and laboratory based research on obesity, including international and national trends in obesity, its determinants, and consequences. The course will provide a broad survey of obesity research, including measurement issues, biological, social and economic etiologies, health and economic consequences, and prevention and treatment of obesity. It also covers the role of nutrigenome and gut microbiome. (3 credits)
BIOL 422: Microbiology	Ann G. Matthysse	Bacterial form, growth, physiology, genetics, and diversity. Bacterial interactions including symbiosis and pathogenesis (animal and plant). Use of bacteria in biotechnology. Brief introduction to viruses. (4 credits including lab)
PHYI 833 Gastrointestinal Physiology: Growth, Cancer,	P. Kay Lund	Roles of growth factor and cytokine signaling, and the intestinal microbiome in normal intestinal growth, inflammation, or colon cancer. Molecular, cellular, genomic, model organisms and translational medicine approaches. (3 credits)

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Inflammation, and  
the Microbiome

EPID 754 Mathematical Modeling of Infectious Diseases	Kim Powers	Introduction to basic methods for analysis and interpretation of epidemiological data on infectious diseases and for predicting the impact of control programs such as HIV prevention programs and vaccination strategies. (3 credits)
EPID 745 Molecular Techniques for Public Health Research	Lola Stamm	Theory and application of selected nucleic acid and protein based techniques for public health research, including topics of sample preparation, PCR, DNA sequencing, genotyping, microarrays, immunoblotting, and immunohistochemistry. (2 credits)
EPID 757: Epidemiology and Social Aspects of HIV/AIDS in Developing Countries	Sharon Weir	This course examines the epidemiology of AIDS from an international perspective. It considers the AIDS pandemic in a broad epidemiologic perspective, including key aspects of basic, clinical, and social science. (3 credits)

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### Social Sciences

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SOCI 818: Race and Ethnicity	Mosi Ifatunji	This course reviews the historical and contemporary sociological literature on race and ethnicity. Students will gain an advanced state-of-the-art understanding of how racial and ethnic groups emerge and evolve, how these constructs shape societies, how they influence intergroup relations, and their role in identity formation. (3 credits)
SOCI 850: Social Stratification	Francois Nielsen	Analysis of major theories of and approaches to the study of social inequality, with attention to how the various theories and approaches are operationalized. Focus on recent research in labor markets and worldwide inequality. (3 credits)
SOCI 851: Sociology of Gender	Kate Weisshaar	Reviews theory on variation in men's and women's gender roles, with emphasis on industrialized societies and women's roles. (3 credits)
SOCI 855: Poverty in America	Kathie Harris	This graduate seminar will study trends, causes, and consequences of poverty in America, covering the topics of single-mother families, child poverty, low-wage work, immigrant families, and welfare reform and social policy. (3 credits)
SOCI 863: Medical Sociology: Health, Illness, and Healing	Liana Richardson	This seminar provides a broad introduction to the sociology of health and illness. Classic and contemporary perspectives, as well as empirical evidence, are covered. Questions such as, "how (and why) are health and illness socially constructed and socially distributed?" and "what can be done to address these phenomena?" are examined. (3 credits)
ANTH 750: Seminar in Medical Anthropology PUBPOL 895: Topics in Poverty and Human Resources	Jocelyn Chua  Sudhanshu Handa	  This course covers topics in poverty, welfare and human resources from an economic perspective, and will be of interest to students who want to specialize in social and behavioral approaches to the study of population and demographic phenomena. (3 credits)
EPID 826: Introduction to Social Epidemiology	Allison Aiello	This course provides an overview of key concepts, methods and findings in research on social determinants of population health. Classes will consist of a didactic presentation followed by in-class group work modules and large group summary discussion (2 credits)
EPID 827: Social Epidemiology: Analysis and Interpretation SOCI 620: Aging and Cohort Analysis in Social and Epidemiological Research	Allison Aiello  Y. Claire Yang	Approaches to social epidemiologic data and application/interpretation of various analytic methods. Topics include multilevel models, econometric and psychometric techniques, and issues in causal inference. (2 credits)  This seminar introduces guidelines for conducting aging and cohort analysis in social and epidemiologic research in which time and change are concerns. Uses three common research designs with an emphasis on new analytic models and methods. (3 credits)

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SOCI 718: Longitudinal and Multilevel Data Analysis	Guang Guo	This course provides an introduction to event history analysis or survival analysis, random effects and fixed effects models for longitudinal data, multilevel models for linear and discrete multilevel data and growth curve models. (3 credits)
SOCI 821: Seminar on Life Course Sociology	Mike Shanahan	Provides an intense introduction to the life course as a theoretical orientation and methodology (logic of inquiry). (3 credits)
SOCI 830: Demography: Theory, Substance, Techniques, Part I	Yong Cai, S. Phillip Morgan	A basic introduction to the discipline of demography. Materials covered include population history, data sources, mortality and fertility trends, and differentials and techniques of analysis. (3 credits)
SOCI 831: Demography: Theory, Substance, Techniques, Part II	Yong Cai	Materials covered include population growth and stable population theory, migration and distribution, population policy, and population estimates and projections. (3 credits)
SOCI 835: Mortality: Social Demographic Perspectives	Bob Hummer	This advanced seminar covers mortality date and measurement, the inequality of death, trends in morbidity and mortality and explanations of mortality decline. Social demographic perspectives receive primary emphasis. (3 credits)
ANTH 897.037: Environment and Population: The Ecology of Risk, Uncertainty, and Demographic Behavior	Paul Leslie	In this seminar, we will be concerned primarily, though not exclusively, with how environmental characteristics (especially the physical and biotic environments, but also the social/economic/political environment as it interacts with the above) affect population characteristics and dynamics. We will be concerned not only with how environmental characteristics affect human populations, but also with how responses to those environmental characteristics - mitigation or coping - in turn affect the environment. A special emphasis will be on the biological and behavioral consequences of environmental fluctuations and unpredictability. (3 credits)
GEOG 541: Geographic Information Systems in Public Health	Mike Emch	Explores theory and application of geographic information systems (GIS) for public health. The course includes an overview of the principles of GIS in public health and practical experience in its use. (3 credits)
GEOG 542: Neighborhoods and Health	Mike Emch	This course explores how neighborhood context influences the health of the populations living in them. It includes a survey of neighborhoods and health theory and empirical examples. (3 credits)
GEOG 805: International Development: Health and Disease Seminar	Mike Emch	We examine human health from the human ecology of disease perspective which is concerned with the ways human behavior, in its cultural and socioeconomic contexts, interacts with environmental conditions to produce or prevent disease. We'll also explore disease distributions from a neighborhoods and health perspective, which is related to disease ecology. (3 credits)
PUBPOL 760: Migration and Health in the U.S.	Krista Perreira	With a focus on Latin American migration to the U.S., this course introduces students to the interrelationships between migration and health. Students will gain an understanding of the theories of migration and the ways in which immigration and settlement policies influence the health and well-being of immigrant populations. (3 credits)
SOCI 728s: Seminar on Social Networks (offered at Duke)	James Moody	Introduction to social network analysis (SNA). History of SNA; social-theoretical foundations of modern network analysis; data collection; data management; analysis and visualization tools. Survey of current applications of SNA within the social sciences. Satisfies Sociology PhD program advanced methods requirement. (3 credits)
SOCI 832: Migration and Population Distribution	Jacqueline Hagan	Treats migration trends, patterns, and differentials and their effects on population distribution in continental and regional areas. Attention is given to theoretical and methodological problems in the study of population movement. (3 credits)
ANTH 623: Human Disease Ecology	Mark Sorenson	This seminar considers cultural ecologies of disease by examining how social, cultural, and historical factors shape disease patterns. We examine how

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ecosystems are shaped by disease, how disease shapes ecosystems, and how cultural processes (e.g., population movements, transportation, economic shifts, landscape modifications, and built environments) contribute to emerging infectious disease.

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\* Indicates a highly recommended basic course