The Department of Health Sciences at the Bouvé College of Health Sciences at Northeastern University provides a unique, transdisciplinary setting that incorporates academics, research, and practice to prepare students for a wide range of career paths. We offer engaging undergraduate academic programs that enable students to major or minor in health sciences, as well as several graduate degree programs, including the Master of Public Health with Concentration in Urban Health, the Master of Science in Exercise Science with Concentration in Physical Activity and Public Health, the Doctor of Philosophy in Population Health, and several dual-degree programs offered in conjunction with the School of Law, the School of Medicine, the College of Engineering, the College of Science, and the School of Urban and Public Affairs.

Our diverse faculty has expertise in the fields of population health, health disparities, nutritional epidemiology, social epidemiology, exercise science, medical sociology, public policy, personal health technologies, neurodevelopmental disorders, and mental health, among many more. Students have the opportunity to work side by side with faculty in conducting cutting-edge research in these fields. We also have research staff highly skilled in providing unique, specialized dietary assessment services.

In line with Northeastern’s commitment to interdisciplinary research and urban engagement, we teach and work closely with many other schools, centers, and departments in the university, including the Institute on Urban Health Research (IUHR), the Center for Community Health Education Research and Service (CCHERS), the Social Science Environmental Health Research Institute (SSEHRI), the Center for Health Informatics Program, and the Physician Assistant Program.

Graduate Certificate
- Exercise Science for Clinicians (http://catalog.northeastern.edu/graduate/health-sciences/exercise-science-clinicians-graduate-certificate)

Courses

**Health Sciences Courses**

**EXSC 5200. Cardiopulmonary Physiology. 3 Hours.**
Offers students an opportunity to gain an understanding of physiological principles of the cardiopulmonary system. This advanced course covers (1) the structure and functional operation and regulation of the cardiopulmonary system; (2) disease-associated physiological changes and cardiopulmonary dysfunction; (3) exercise-induced acute responses and physiological adaptations of the system and their applications to chronic cardiopulmonary diseases. Encourages students to integrate their knowledge of exercise and physical activity with cardiopulmonary health and fitness, as well as cardiopulmonary disease prevention and treatment. Restricted to graduate students in exercise science and undergraduate students minoring in exercise science.

**EXSC 5210. Physical Activity and Exercise: Prescription, Measurement, and Testing. 3 Hours.**
Studies the general principles of physical activity and exercise prescription, measurement, and testing. Offers students an opportunity to learn the fundamental concepts and techniques to measure physical activity, exercise, and related testing procedures through a hands-on approach. Topics include the use of questionnaires and activity monitors to measure physical activity; measurement of body composition, fitness, muscular strength, and endurance; and clinical exercise testing. The fundamental concepts of exercise prescription and use of measurement techniques taught in this course are applicable to careers in physical therapy, exercise physiology, and as a physician assistant. Requires prior completion of EXSC 4500 or equivalent undergraduate course or permission of instructor.

**EXSC 5220. Advanced Exercise Physiology. 3 Hours.**
Covers the advanced study of concepts, principles, and research in the field of exercise physiology. Discusses advanced concepts in the muscular/neuromuscular, cardiovascular, ventilatory, endocrine, and metabolic responses to exercise and exercise training. Specific study of the physiological control mechanisms regulating these systems are also addressed during periods of rest, acute exercise, and following chronic exercise training.
EXSC 5230. Physical Activity and Exercise: Effects on Musculoskeletal Health and Disease. 3 Hours.
Seeks to provide a foundation for understanding the benefits of physical activity and exercise and the detrimental effects of physical inactivity and sedentary behavior on musculoskeletal health. Studies the function/dysfunction of the musculoskeletal systems resulting in common/uncommon disorders and the prevalence, etiology, and benefits of physical activity/exercise. Students apply previously learned exercise physiology principles, such as exercise prescription and neural and motor control adaptations, to physical activity and exercise. Discusses key physiological mechanisms underlying common/uncommon musculoskeletal disorders. Examines the preventive and beneficial effects of physical activity and exercise endorsed by the American College of Sports Medicine. Restricted to graduate students in exercise science and to undergraduate students minoring in exercise science.

EXSC 6202. Electrocardiography, Clinical Assessment, and Prescription. 3 Hours.
Focuses on the identification and management of chronic diseases. Offers students an opportunity to learn skills to interpret EKGs. Topics include cardiac electrophysiology, lead systems, dysrhythmia recognition and treatment, axis, infarction, ischemia, hypertrophy, and the effects of cardiovascular drugs and exercise on the EKG. Through case studies, students interpret exercise test results, prescribe exercise, and evaluate exercise programs for clinical conditions such as cardiovascular disease, pulmonary conditions, and metabolic diseases.

EXSC 6300. Internship in Exercise Science. 3 Hours.
Offers students an opportunity to obtain practical experience and to synthesize, integrate, and apply skills and knowledge learned in the exercise science curriculum in a professional environment. Field experiences are an important part of graduate education programs in exercise science. The student is expected to complete a minimum of 300 hours of supervised experience in a research or practice setting. May be repeated once.

EXSC 6400. Applied Research Methods. 3 Hours.
Studies how to conduct scientific research in exercise science. Offers students an opportunity to propose a research project and design appropriate methodology to complete the project. Includes discussions on developing research hypotheses, comparing study designs, selecting appropriate statistical analyses, and managing data collection. Incorporates interpretation of published research to support the proposed research. Students present their own research plans through scientific writing.

EXSC 6962. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

EXSC 7990. Thesis 1. 3 Hours.
Provides initiation to scholarly investigation. Requires students to submit a written research proposal, which includes the first three chapters of the thesis (introduction, review of literature, and methods and procedures) for approval by a thesis committee and to present an oral proposal at a seminar. May be repeated once.

HSCI 5230. Clinical Nutrition Applications in Health and Disease. 3,4 Hours.
Prepares health professionals to effectively communicate principles of diet and nutrition to their clients and the public. Covers public health promotion strategies, techniques used to teach diet and nutrition, and behavioral theories used in diet and nutrition intervention. Emphasizes clinical applications for the treatment of weight disorders, diabetes, cardiovascular disease, eating disorders, and nutrition in the life cycle.

PHTH 5120. Race, Ethnicity, and Health in the United States. 3 Hours.
Explores the role of economic, social, and individual factors in explaining racial and ethnic health disparities and examines intervention approaches to eliminate them. Topics include genetic and social constructions of race and ethnicity, measuring race and ethnicity, and the differences in prevalence and patterns of disease across groups; cultural and structural factors that affect healthcare delivery, such as discrimination, racism, and health status; and public health approaches to prevention and improving healthcare delivery.

PHTH 5202. Introduction to Epidemiology. 3 Hours.
Introduces the principles, concepts, and methods of population-based epidemiologic research. Offers students an opportunity to understand and critically review epidemiologic studies. Lectures and discussions aim to serve as a foundation for training in epidemiology, quantitative methods, and population-based health research. The course is a required introductory course for students in the Master of Public Health program and is appropriate for students who are interested in epidemiologic research. Students not meeting course restrictions may seek permission of instructor.

PHTH 5210. Biostatistics in Public Health. 3 Hours.
Offers public health students an opportunity to obtain the fundamental concepts and methods of biostatistics as applied predominantly to public health problems and the skills to perform basic statistical calculations. Emphasizes interpretation and comprehension of concepts. Topics include descriptive statistics, vital statistics, sampling, estimation and significance testing, sample size and power, correlation and regression, spatial and temporal trends, small area analysis, and statistical issues in policy development. Draws examples of statistical methods from the public health practice. Introduces use of computer statistical packages. Requires permission of instructor for students outside designated programs.

PHTH 5212. Public Health Administration and Policy. 3 Hours.
Offers students an opportunity to obtain practical knowledge concerning the planning, organization, administration, management, evaluation, and policy analysis of health programs. Surveys what we know and think about public health administration and policy and what we do in practice. Introduces the main components of public health policy and administration using notable conceptual frameworks and case studies. Requires permission of instructor for students outside designated programs.

PHTH 5214. Environmental Health. 3 Hours.
Introduces the field of environmental health, which encompasses concerns related to physical, built, and social environments. Discusses the tools used to study environmental exposures and diseases. Examines environmental health hazards, the routes by which humans are exposed to hazards, various media in which they are found, and disease outcomes associated with exposures. Offers students an opportunity to become familiar with methods used to conduct environmental health research and with the federal and state agencies responsible for protecting environmental health.
PHTH 5222. Health Advocacy. 3 Hours.
Seeks to educate students about the role of advocacy in public health while providing tools and support to address current healthcare issues. Provides information and theory about advocacy, education, and community organizing in public health practice and skills geared toward direct application. Covers various techniques related to developing and conducting an advocacy project within a community setting. Offers students an opportunity to develop, communicate, and refine a community-based advocacy program. Requires permission of instructor for students outside designated programs.

PHTH 5224. Social Epidemiology. 3 Hours.
Focuses on social epidemiology, which is defined as the study of the distribution and determinants of health in populations as related to the social and economic determinants of health. Includes theories, patterns, and controversies, as well as programs and policies that can be applied to address health inequalities. Readings include articles that situate one dimension of social epidemiology with articles addressing the empirical patterns, address prevailing theories and controversies regarding the causes of the inequalities, as well as address interventions or policies that may be applied to address the inequalities. Requires permission of instructor for students outside designated programs.

PHTH 5226. Strategic Management and Leadership in Healthcare. 3 Hours.
Focuses on management challenges facing healthcare organizations, particularly community-based agencies and their role in the public healthcare delivery system. Introduces strategic thinking and leadership approaches that must be considered for managing a successful healthcare organization. Selected topics include strategic planning; organizational development and the barriers to organizational change; relationship management with key internal and external constituencies; marketing, financial management, and contract negotiation; evolving principles of health insurance and the changing role of the consumer; and the key elements for effective organizational leadership in today's evolving healthcare marketplace. When appropriate, outside experts are used to supplement readings, case studies, and lecture and discuss practical real-world challenges in leading various healthcare initiatives. Requires permission of instructor for students outside designated programs.

PHTH 5228. Advances in Measuring Behavior. 3 Hours.
Examines current and emerging methods of measuring human behavior known to impact human health. Discusses some of the most common instruments used to measure everyday behaviors and considers how emerging technologies may change how these behaviors are measured in the future. Explores the measurement of behaviors such as activities of daily living, dietary decision making, patterns-of-eating behavior, physical activity, sedentary behavior/posture, screen time, activity in the community, social connectedness, stress and stressful events, affective state, medication adherence, use of alcohol and addictive substances, risky behaviors, and physiological states that can be measured using wearable devices in the field (e.g., heart rate and blood pressure). This is a survey and project-oriented course.

PHTH 5230. Global Health. 3 Hours.
Presents an overview of global health issues and focuses on less economically developed countries. Covers measures of disease burden; demography of disease and mortality; Millennium Development Goals (under the auspices of the United Nations); infectious diseases such as HIV/AIDS, tuberculosis, and malaria and their prevention; vaccine utilization and potential implications; chronic diseases; tobacco-associated disease; nutritional challenges; behavioral modification; mother and child health; health human resources; and ethical issues in global health. LAW 7630 and PHTH 5230 are cross-listed.

PHTH 5232. Evaluating Healthcare Quality. 3 Hours.
Focuses on the conceptual and methodological foundations for evaluating the quality of care of healthcare providers—both individual providers and healthcare organizations. Aimed at students pursuing careers in public health, public policy, healthcare management, and the various health professions in the growing field of quality evaluation and improvement. Also designed to give healthcare providers an appreciation for how they may be evaluated. Examines scientific issues in the measurement of quality of care as well as key quality evaluation methods. Also covers the use of risk adjustment and other methodologies for comparing the quality of healthcare providers. Focuses on mechanisms that assess quality, including licensure, accreditation, and board certification.

PHTH 5234. Economic Perspectives on Health Policy. 3 Hours.
Uses basic economic concepts to illuminate the many factors that shape health, healthcare, and the healthcare system in the United States. Examines the role of these concepts in explaining the challenges faced in achieving three core goals of the healthcare system: increasing access, limiting cost, and improving quality. Explores how policy makers, market participants, and others can remedy access, cost, and quality deficiencies. Illustrates how economic concepts can be applied to the study of health and health behaviors.

PHTH 5236. Public Health Nutrition. 3 Hours.
Covers public health nutrition issues among individuals, communities, and populations living in urban settings. Emphasizes issues about vulnerable populations, such as ethnic minorities, women, children, and the elderly. Topics include food and nutrition science; evaluation of specific nutrition programs; and the understanding of the role of public health services, policies and legislation, funding, marketing, and communication strategies for the development, evaluation, implementation, and dissemination of nutrition programs. Briefly reviews international public health nutrition issues such as world hunger and food insecurity.

PHTH 5300. Project Management in Public Health. 1 Hour.
Presents principles of project management as applied to public health organizations and their programs. Offers students an opportunity to learn the components of the project management life cycle, including human resource components, material resources, and related components.

PHTH 5310. Budget Principles in Public Health. 1 Hour.
Details the public health revenue and funding environment, identifies key budget development functions, and describes the importance of utilizing the budget process for sound management of the programs. Public health programs in public agencies and nonprofit organizations require managerial skills to assure that programs are implemented efficiently and effectively. Funding for public health frequently comes from governmental revenue sources—federal and state budgets or grants from government or foundations. It is critical that the funds are utilized well and appropriate to the objectives of the agency and program. Advancing the environment for public health through effective budgeting and promotion of program impact is important to support the continued funding for public health. The course takes students through these topics and offers them the opportunity to gain the practical experience of developing a budget for a public health program as the central activity.

PHTH 5320. Grant Writing in Public Health. 1 Hour.
Explores the grant funding landscape, identifies different types of funders and grants, and identifies potential funders. Offers participants an opportunity to develop their skills in grant writing and in reviewing grants, to develop a grant proposal, and to understand the submission and peer review process.
PHTH 5440. Community-Based Participatory Research: Environmental Health. 3 Hours.
Aims to prepare students for community-based participatory research (CBPR) through historical, theoretical, and methodological materials. Through visits with experienced CBPR researchers, studies the need for, benefits of, and challenges to community-grounded research. Uses the lens of local environmental justice issues to emphasize the importance of CBPR to environmental health and justice work. Offers students an opportunity to engage in hands-on labs, to develop research tools to study their own community as students, to critically analyze CBPR cases, and to develop their own strategic plan to research a pressing environmental health and justice issue through CBPR. Introduces students to critical studies of science and technology.

PHTH 5540. Health Education and Program Planning. 3,4 Hours.
Focuses on underlying concepts of health education and explores current health education issues that require intervention. Covers program planning models and theories used in health education. Offers students an opportunity to develop a working knowledge of the planning process for health education through the analysis of case studies and by creating a program plan to address a health issue of their choice. Provides health science students with preparation for HSCI 4710, in which they may choose to implement and evaluate their program plan.

PHTH 6200. Principles and History of Urban Health. 3 Hours.
Focuses on the aspects of urban development and life that impact the health and well-being of city residents. Offers students an opportunity to learn about the impact of migration patterns, built environments, occupational stratification, and other cultural and community contextual factors that impact health status and healthcare access. Examines the level of overall health and healthcare found in urban populations, particularly the urban poor, and the disproportionate impact on racial and ethnic minorities in the United States and elsewhere. Considers public policy approaches for addressing the unique health issues of urban areas. Examines urban health issues both from a national and international perspective. Requires permission of instructor for students outside designated programs.

PHTH 6202. Intermediate Epidemiology. 3 Hours.
Offers an intermediate-level course covering key principles, concepts, and methods of population-based epidemiologic research. Topics include observational study designs, measures of disease occurrence and association, validity and bias, confounding, effect modification, multivariate analysis for stratification and adjustment, critical appraisal and meta-analysis, mediation analysis, missing data analysis, and concepts and methods for strengthening causal inference. Offers graduate students unique opportunities to engage in practical applications, including critical reviews of published epidemiologic journal articles, and to conduct hands-on analyses of empirical datasets using SAS statistical software. Designed to serve as a foundation for further advanced training in specialized branches of epidemiology, quantitative methods, and epidemiologic research.

PHTH 6204. Society, Behavior, and Health. 3 Hours.
Explores individual, interpersonal, and social influences on health. Offers students in public health an opportunity to learn the application of the social and behavioral sciences. Examines foundations of public health, including prevention and the prevention paradox, theories of disease causation, and public health ethics. In addition, multilevel influences on health are examined, including behavioral theories and social determinants of health. Throughout the semester, attention is paid to disparities in health. Finally, we examine strategies to reduce health disparities, such as education, interventions, and policy-level changes, and discuss their relative effectiveness. Requires permission of instructor for students outside designated programs.

PHTH 6208. Urban Community Health Assessment. 3 Hours.
Offers students an opportunity to develop a basic understanding of the complex public health issues confronting urban communities across the nation. Uses a community organization and development framework for public health practice. Seeks to provide skills, tools, and experiential learning opportunities that result in community assessments that may be used in public health planning, programming, and policy. Covers key principles and methods for conducting community health assessments utilizing a range of quantitative and qualitative methods, including community epidemiology, major data sets, surveillance data, behavioral risk and other population-based surveys, as well as other primary and secondary data sources. Includes collaborative and interactive exercises, including self- and group reflection, Internet and contemporary media exploration, and in-class discussions. Requires permission of instructor for students outside designated programs.

PHTH 6210. Applied Regression Analysis. 3 Hours.
Builds upon the fundamental concepts and methods of biostatistics with applications to health disciplines. Topics include hypothesis testing, analysis of variance, linear regression, multiple regression, and logistic regression. Examples and readings are drawn from the public health literature. The SAS statistical software package is introduced and used throughout the course.

PHTH 6320. Qualitative Methods in Health and Illness. 3 Hours.
Discusses qualitative inquiry in general and specifically in topics related to public health and experiences of self, health, illness, and the body. Qualitative research aims to achieve in-depth and contextual understanding of people, culture, and societies and usually employs texts, interviews, published materials, images, and focus group discussions as sources of data. The course integrates theoretical and methodological readings and discussions with designing and conducting a qualitative project. Offers students an opportunity to understand meanings of health, illness, and the body in a variety of "local worlds" and reflect on their importance for informing policy, public health, research, and practice. Requires prior completion of one undergraduate or graduate-level course in research methods.

PHTH 6350. Social Survey Research Methods. 3 Hours.
Offers an overview of social survey research methodology. Social surveys are widely used in the health and social sciences and they are sources of many important discoveries. Covers how theory and research objectives drive key decisions about the survey design process—which include sampling, measurement, and modes of data collection—in a framework that minimizes error at each step. Uses materials developed by leading academic social survey researchers and organizations as models for how students can use existing surveys and design their own surveys to accomplish their research goals. There are many lively debates about best practices as researchers adapt to new technologies, falling response rates, ethical quandaries about engaging human subjects, and increasing research costs.

PHTH 6400. Principles of Population Health 1. 3 Hours.
Seeks to provide students with historical background and methodological and critical-thinking tools needed to perform high-quality, interdisciplinary research in population health. Using a problem-solving and interdisciplinary framework, offers students an opportunity to gain the skills to develop research hypotheses, design research strategies, analyze data to test study hypotheses, and communicate their findings both orally and in writing. Also offers students an opportunity to gain experience in research methodology and application of basic methods for population health research, including epidemiological and biostatistical concepts. Finally, students demonstrate their mastery of these skills through problem sets and through written proposals that include communication of preliminary data.
PHTH 6410. Principles of Population Health 2. 3 Hours.
Continues PHTH 6400, exploring additional population health research topics and methods and applying more advanced biostatistical and epidemiological analysis methods.

PHTH 6440. Advanced Methods in Biostatistics. 3 Hours.
Explores in detail the analysis of complex survey design, including adjustments for cluster sampling, weighting, and stratification. Designs that incorporate clustering of data are common in health science research. These designs are characterized by data that capture nonindependent repeated measurements on primary sampling units or that collect data with schemes more complex than simple random sampling. The statistical analyses of these types of data need to include appropriate adjustments to provide proper estimates and accurate testing. The second part of the course investigates the use of mixed regression models to analyze repeated measurements on individuals, multilevel data, and growth models.

PHTH 6450. Systematic Reviews of Scientific Literature. 3 Hours.
Offers students an opportunity to learn how to conduct a systematic review of scientific literature, including developing a question of appropriate scope and clinical relevance, development of abstraction tool, selection of articles, and drafting of all sections of the review including tables and figures. Students produce a systematic review in a topic area of substantive interest.

PHTH 6460. Analysis of Messy Data. 3 Hours.
Covers the foundations and application to messy data for various statistical approaches, including generalized additive models, robust regression, blocking and matching, propensity score analyses, bootstrap and resampling methods, and classification trees. General linear models are widely used for exploring and testing associations in cohort and observational studies. When assumptions hold and the models are correctly specified, these approaches provide unbiased estimates and powerful tests that have very desirable properties. However, in applied health science research, one often finds one's data are “messy” and usual approaches need to be modified and adapted to provide valid inferences. Highly confounded variables, strong nonlinear associations, incomplete or missing data, or highly interacted associations can require special considerations.

PHTH 6800. Causal Inference in Public Health Research. 3 Hours.
Exposes students to causal inference approaches, including causal diagrams and counterfactual theory. Students are also asked to draw upon their own research experiences and prior epidemiology training to evaluate public health studies. Covers how to apply the fundamental concepts of counterfactuals and causal diagrams; assess threats to validity in study designs and analysis, including confounding, selection bias, and measurement error/misclassification; evaluate the validity of a public health research study's design and analysis with respect to addressing causal questions; and critically analyze scientific literature and apply findings to clinical or policy decisions. Offers students an opportunity to think critically and rigorously about the implications of study design and analysis toward addressing public health questions.

PHTH 6902. Capstone 2. 2 Hours.
Constitutes the second of three public health capstone courses. Students work on-site in a range of diverse public health practice settings reflective of their particular urban health focus. Offers students an opportunity to integrate their theory and practice experiences in a major research, program planning, program implementation, policy development, management, service delivery, or evaluation project. Capstone projects are student-led and designed in consultation with community partners and faculty advisors.

PHTH 6910. Public Health Capstone. 3 Hours.
Offers students an opportunity for scholarly work on-site in a range of diverse public health settings reflective of their particular urban health focus. Students have an opportunity to integrate their theory and practice experiences in a major research, program planning, program implementation, policy development, management, service delivery, or evaluation project. Student-led and designed in consultation with community partners and faculty advisors, seeks to support students in the implementation and completion of their projects.

PHTH 6966. Practicum. 3 Hours.
Provides eligible students with an opportunity for practical experience.

PHTH 7976. Directed Study. 1-3 Hours.
Offers the student the opportunity to bring individual, concentrated attention to a particular public health topic or competency area as arranged and agreed upon in advance by a faculty member and the student. This option is generally recommended when the student desires a more intensive analysis of a particular subject. May be repeated without limit.

PHTH 8960. Exam Preparation—Doctoral. 0 Hours.
Offers students an opportunity to prepare for the PhD qualifying exam under faculty supervision.

PHTH 8984. Research. 1-4 Hours.
Offers an opportunity to conduct research under faculty supervision. May be repeated without limit.

PHTH 8986. Research. 0 Hours.
Offers an opportunity to conduct research under faculty supervision. May be repeated without limit.

PHTH 9000. PhD Candidacy Achieved. 0 Hours.
Indicates successful completion of program requirements for PhD candidacy.

PHTH 9990. Dissertation. 0 Hours.
Offers doctoral students an opportunity to work with their advisors and doctoral research committees to perform their doctoral research and to write their dissertation. Restricted to Bouvé doctoral candidates only. May be repeated once.

PHTH 9994. Dissertation Continuation—Part Time. 0 Hours.
Offers continued dissertation supervision by members of the department. May be repeated without limit.

PHTH 9996. Dissertation Continuation. 0 Hours.
Offers continuation of dissertation research to doctoral students. Restricted to Bouvé doctoral candidates only. May be repeated without limit.

PHTH 9996. Dissertation Continuation. 0 Hours.
Offers continuation of dissertation research to doctoral students. Restricted to Bouvé doctoral candidates only. May be repeated without limit.