

# MIEH - MARYLAND INSTITUTE FOR APPLIED ENVIRONMENTAL HEALTH

## **MIEH400 Introduction to Global Health (3 Credits)**

Exploration of theoretical frameworks and practical perspectives on issues shaping the global health panorama. Determinants examined through: biological and epidemiological; social, cultural and economic; environmental and geographic; multi-section, legal and institutional perspectives with synopsis of how these issues are addressed by international and community organizations in developing countries.

**Prerequisite:** Minimum grade of C- in MIEH300; and 1 course with a minimum grade of C- from (SPHL100, PHSC300).

**Restriction:** Must be in the Public Health Science program or must have permission of the program director; and must have completed 60 credits.

**Credit Only Granted for:** MIEH400 or SPHL498A.

**Formerly:** SPHL498A.

## **MIEH407 One Health: Food Safety and Security (3 Credits)**

This is a collaborative course with the University of Maryland and Cairo University, Cairo, Egypt to explore the One Health Foundation and its application to improving international food safety and security. The purpose of this global undergraduate class is to disseminate knowledge on One Health and its application to improving global food safety and security. Students will apply principles of One Health to ensure food safety and food security in Egypt.

**Restriction:** Must have earned at least 75 credits . Jointly offered with: MIEH607.

**Credit Only Granted for:** MIEH607 or MIEH407.

## **MIEH480 Introduction to Occupational Health (3 Credits)**

Work, the way it is organized, and the workplace environment has an impact on public health and workers' and their families' physical and psychological health. The course introduces students to the field of occupational health and safety, and ensures that workers' health is considered in all public health practice and policy. Basic concepts in occupational safety and health are discussed, as well as methods to anticipate, recognize, evaluate, and control environmental factors or stresses arising in or from the workplace. In addition to instructor-led lectures, guest speakers will be invited to discuss case studies and/or discuss workplace hazards unique to specific populations.

**Prerequisite:** Minimum grade of C- in MIEH300 and EPIB301.

**Recommended:** BSCI201.

## **MIEH600 Foundations of Environmental Health (3 Credits)**

Overview of the chemical, physical and biological hazards present in our living and working environment and their effects on human health. Topics include: exposure assessment, industrial hygiene and safety, pesticides, community and indoor pollution, food-borne diseases, solid and hazardous wastes, water resources, risk assessment, ecological issues and environmental laws.

**Credit Only Granted for:** HLTH761 or MIEH600.

**Formerly:** HLTH761.

## **MIEH605 Fundamentals of Global Health (3 Credits)**

Exploration of theoretical frameworks and practical perspectives in global health with particular attention to the analysis of the biological, epidemiological, social, cultural and behavioral interactions that affect global health study and project implementation. The emphasis is on innovative solutions to health issues in underserved populations.

**Credit Only Granted for:** SPHL600 or SPHL698A.

**Formerly:** SPHL698A.

## **MIEH607 Global Classroom: Risk Based Approach to Ensure Global Food Safety and Security (3 Credits)**

This is a collaborative course among the University of Maryland and Cairo University, Cairo, Egypt to explore the One Health Foundation and its application to improving international food safety and security. The purpose of this global class is to disseminate knowledge on One Health and its application to improving global food safety and security. Students will have the opportunity to collaborate with Cairo University and the Agriculture Research Center in Egypt to explore the current status and challenges of global food safety and security. Jointly offered with: MIEH407.

**Credit Only Granted for:** MIEH407 or MIEH607.

## **MIEH609 Methods in Environmental Health (1-3 Credits)**

This research-based rotation in environmental health sciences will provide graduate students with the opportunity to work closely with faculty researchers in the Maryland Institute for Applied Environmental Health (MIAEH) within the School of Public Health. Our research covers multiple fields within the environmental health sciences (e.g. environmental epidemiology, exposure science, risk assessment, environmental microbiology, environmental microbiology, environmental microbial genomics, food toxicology, airborne infection transmission, environmental justice, and children's environmental health) that involve either laboratory-based research or non-laboratory based studies. Students will not only gain invaluable research experience and interpersonal skills but also contribute to MIAEH's ongoing environmental health research programs.

**Repeatable to:** 6 credits.

## **MIEH610 Global Health Program Planning and Evaluation (3 Credits)**

Development of health program and evaluation plans to address critical health problems in international settings, especially transitional or in-conflict countries. Emphasis on linking a tactical program plan to overall health problems of a nation, to include the policy and economic issues involved in assessment, implementation and evaluation.

**Recommended:** MIEH605.

**Credit Only Granted for:** MIEH610, SPHL610 or SPHL698D.

**Formerly:** SPHL698D and SPHL610.

## **MIEH620 Global Health Communication and Promotion (3 Credits)**

Explores the critical components in developing, implementing and evaluating health/population promotion and communication interventions. Emphasis is on theory application to a variety of cultural settings. Formative and quantitative research methods will be utilized.

**Recommended:** MIEH605.

**Credit Only Granted for:** SPHL620 or SPHL698C.

**Formerly:** SPHL698C.

## **MIEH688 Seminar in the Maryland Institute for Applied Environmental Health: Current Topics in Environmental Health (1 Credit)**

Invited and in-house research presentations from guest scientists, faculty members, and students, and critical analysis of journal articles on current topics in environmental and occupational health.

**Repeatable to:** 3 credits.

**MIEH690 UMD Global STEWARDS: Experiential Exploration of Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS) (3 Credits)**

Experiential introduction to broad food, energy, water (FEW) nexus topics, focusing on how integration across the biological, physical, social, behavioral, computer and engineering sciences will be critical in solving FEW systems challenges. FEW nexus issues from molecular to societal levels and from local to global scales will be covered. Course meetings will include active learning-based lectures, discussions, on-campus and off-campus field trips, hands-on activities, brainstorming about interdisciplinary FEW systems projects, and guest lectures.

**Restriction:** Permission of instructor; and must be in UMD Global STEWARDS Fellows.

**MIEH691 UMD Global STEWARDS: Project-Based Data Practicum at the Nexus of Food, Energy, and Water Systems (3 Credits)**

The range of food-energy-water (FEW) systems challenges from local to global scales. During the semester, students will gain real-world experience by participating in the conceptualization and/or conduct of an interdisciplinary FEW systems project. Projects may employ engineering, life sciences, epidemiological or policy approaches; earth system sciences frameworks; computational methods; and/or other innovative approaches. Through this work, students will gain hands-on experience in study design, research methods, and data analysis across varying FEW disciplines. Each student will bring a diverse set of expertise to the projects, creating a microcosm for interdisciplinary team science. During the course, students will have the opportunity to refine oral and written communication skills, including team writing. The deliverable for the course may include a grant proposal, a manuscript, a FactSheet, an Op-Ed, or another actionable type of science/policy writing.

**Prerequisite:** MIEH690.

**Restriction:** Permission of instructor; and must be in UMD Global STEWARDS Fellows.

**MIEH698 Special Topics in Environmental Health (1-3 Credits)**

Special topics in environmental health.

**Repeatable to:** 12 credits if content differs.

**MIEH699 UMD Global STEWARDS: Seminal Findings, and Research and Policy in Progress at the Food, Energy, Water Nexus (1 Credit)**

Engaging discourse covering seminal findings, as well as research and policy in progress at the food, energy, water (FEW) nexus. Course meetings will include dissections of groundbreaking FEW nexus articles; presentations by faculty members and students, followed by interdisciplinary discussions; and presentations by visiting leaders working at the FEW nexus across career sectors.

**Restriction:** Permission of instructor.

**Repeatable to:** 3 credits.

**MIEH700 Advanced Environmental Health (3 Credits)**

An advanced doctoral course in environmental health science focused on the application of knowledge gained in foundational and scientific methods courses to solve environmental health problems. The course will engage students in: problem identification; critical evaluation of the existing state of scientific knowledge and gaps regarding the problem; selection and use of appropriate scientific methods to assess the problem; generation of accurate conclusions based on critical evaluation of the findings; and, finally, accurate communication of findings, uncertainties and conclusions to various target audiences and stakeholders.

**Prerequisite:** MIEH600 and MIEH780; and permission of instructor.

**MIEH720 Principles of Toxicology (3 Credits)**

Overview of toxicology, including exposure pathways, toxicokinetics, dermal toxicants, carcinogens, and genetic, reproductive, immuno-, neuro-, target organs, complex mixtures, structure-activity analysis, and determinants of hypo- and hyper-susceptibility. Case studies of global national and regional interest.

**Prerequisite:** MIEH600; or permission of instructor.

**Recommended:** Must have completed some coursework in chemistry and/or biology.

**MIEH721 Physiological Toxicology (3 Credits)**

Emphasis on macromolecular, metabolic, cellular, and physiologic targets of environmental contaminants and assays to detect toxic effects at these levels. Discussion of effects of select environmental toxicants in the context of their disruption of normal processes. Examination of the design of short-term assays and their desirable features to maximize usefulness for predicting human disease.

**Prerequisite:** MIEH600.

**Recommended:** Must have completed coursework in chemistry, biology, biochemistry, and genetics.

**MIEH722 Laboratory Methods in Environmental Health (3 Credits)**

Application of chemical principles to environmental monitoring. Basic sampling techniques and laboratory tests to determine chemical and microbiological pollutants in water, air and soil from field-collected samples.

**Prerequisite:** MIEH600.

**Recommended:** Must have completed coursework in analytical chemistry, microbiology, biochemistry.

**MIEH725 Environmental Analysis (3 Credits)**

Fundamentals of environmental chemistry and in environmental media (water, air, soil) and in biota. Theory of sampling, chemical analysis and quality control for major environmental contaminants. Introduction to spatial and statistical analysis, use of maps and Geographic Information Systems, and use of environmental analysis in remediation and pollution prevention.

**Prerequisite:** MIEH600.

**Recommended:** MIEH722.

**MIEH730 Environmental Justice, Built Environment, and Health Disparities (3 Credits)**

This course will give students the opportunity to conduct an in-depth analysis of environmental justice and environmental racism in the United States and internationally. Students will synthesize their knowledge from environmental science courses with the concepts of civil rights and social justice to more fully understand the existing health disparities and how the built environment contributes to them.

**Prerequisite:** Must have completed an Environmental Health course.

**MIEH735 Food Toxicology (3 Credits)**

An introduction to basic concepts in toxicology in relation to toxic food contaminants and additives; both synthetic and naturally occurring. Focus on exposure routes, molecular targets and susceptible individuals. Also includes regulatory toxicology with respect food toxins.

**Recommended:** BCHM462, BSCI440, or CHEM131. Cross-listed with NFSC735.

**Credit Only Granted for:** MIEH735 or NFSC735.

**MIEH740 Environmental Health Risk Assessment (3 Credits)**

Review of the major methods of human and ecological risk assessment conducted by the U.S. Environment Protection Agency. Emphasis on sources of uncertainty.

**Prerequisite:** MIEH600; or permission of instructor.

### **MIEH742 Principles of Industrial Hygiene (3 Credits)**

Theory and practice of industrial hygiene, including major industrial exposures and their sampling and measurement. Focus on specific industries, work populations, and environments.

**Prerequisite:** MIEH600 and MIEH720.

### **MIEH760 Spatial Epidemiology (3 Credits)**

The purpose of this survey course is to provide students with an introduction to spatial resources and methods specific to public health, with an emphasis on epidemiology and environmental applications. Students will be introduced to spatial resources, concepts, and tools relevant to public health research and practice. They will acquire skills to interpret, evaluate, and design basic public health spatial research projects; and to conduct simple spatial analyses.

**Prerequisite:** Must have completed an Introduction biostatistics course.

**Recommended:** Completion of a graduate epidemiology course, or environmental health course, or geography/GIS course.

### **MIEH770 Law and Policy in Environmental Health (3 Credits)**

Overview of laws that affect the environment, and the various ways in which businesses are regulated by the government in the interest of protecting the environment. International, Federal, state, and local laws and regulations related to the protection of human health and the regulation of environmental containments, including biological, physical and chemical factors affecting community health. Examination of the interactions between and differing responsibilities of various agencies enforcing environmental laws and regulations.

**Prerequisite:** MIEH600; or permission of instructor.

### **MIEH771 Exposure Assessment of Environmental Hazards (3 Credits)**

Approaches and methods for determining exposure to environmental contaminants. Biomonitoring and genetic methods to detect recent exposures. Optimizing exposure assessment.

**Prerequisite:** MIEH600; and must have completed a graduate level statistics course with a B- or higher. Or permission of instructor.

### **MIEH773 Foodborne, Waterborne and Airborne Infectious Diseases (3 Credits)**

In-depth study of foodborne, waterborne and airborne diseases caused by bacteria, viruses and parasites. Topics will include sources and detection of causative agents; their transmission to humans via food, water, air and other environmental media; and methods of disease prevention, including food safety approaches and drinking water treatment. Classes include lectures, discussions, field-trips and hands-on field sampling and laboratory activities.

**Corequisite:** MIEH600; or permission of instructor.

### **MIEH778 Practical Experience in Public Health (1-4 Credits)**

Practice experience and seminar providing an opportunity to apply previously acquired knowledge and skills in a health or allied health organization. Setting of the practice experience will depend upon the student's background and career goals.

**Restriction:** Permission of SPHL-Maryland Institute for Applied Environmental Health.

**Repeatable to:** 4 credits.

**Credit Only Granted for:** MIEH785 or MIEH778.

### **MIEH780 Occupational Health (3 Credits)**

A synthesis of epidemiology, toxicology, exposure science, risk assessment, and policy. Emphasis will be on methods for anticipating, recognizing, evaluating and controlling workplace hazards; the hierarchy of controls; and current hot topics in occupational health.

**Prerequisite:** MIEH720 and MIEH771; and must have completed SPHL602. Or permission of instructor.

### **MIEH783 Proposal Development and Marketing for Public Health Scientists (3 Credits)**

Every scientist, whether in academia, government, or industry, must write compelling proposals if they are to succeed in having resources to pursue their passions and interests. To write a compelling proposal, we must develop clear and concise hypotheses and definitive ways to test them. But to have an impact, to get funded, to graduate, we must also excel at marketing our ideas and our achievements to other scientists and the public. This course is designed for doctoral students and postdoctoral fellows who want to develop and hone their proposal development and marketing skills.

### **MIEH785 Internship in Public Health (3 Credits)**

Internship and seminar providing an opportunity to apply previously acquired knowledge and skills in a health or allied health organization. Setting of the internship will depend upon the student's background and career goals.

**Restriction:** Permission of SPHL-Maryland Institute for Applied Environmental Health.

**Credit Only Granted for:** MIEH785 or MIEH778.

### **MIEH786 Capstone Project in Public Health (3 Credits)**

Capstone experience providing opportunity to apply knowledge and skills to a specific public health problem or issue. Completion of project relevant to public health under the direction of an advisor.

**Prerequisite:** Permission of SPHL-Maryland Institute for Applied Environmental Health.

### **MIEH788 Critical Readings in Environmental Health (1-3 Credits)**

In-depth examination and critical discussion of the current literature relevant to environmental health.

**Prerequisite:** MIEH600.

**Repeatable to:** 3 credits if content differs.

### **MIEH789 Independent Study (1-6 Credits)**

Individual reading and/or research under a specific faculty member in the department.

**Prerequisite:** Permission of SPHL-Maryland Institute for Applied Environmental Health.

### **MIEH799 Master's Thesis Research (1-6 Credits)**

### **MIEH899 Doctoral Dissertation Research (1-8 Credits)**