

Milken Institute School of Public Health

THE GEORGE WASHINGTON UNIVERSITY

School of Public Health Department of Epidemiology and Biostatistics

Master of Science in Public Health Microbiology and Emerging Infectious Diseases

2015-2016

Program-at-a-Glance

Note: All curriculum revisions will be updated immediately on the website <http://www.publichealth.gwu.edu>

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Mission

The mission of the MS degree in Public Health Microbiology and Emerging Infectious Diseases is to provide training to a new generation of public health professionals to expand knowledge and expertise in the areas of disease mechanisms, with an emphasis on microbial pathogens, the use and application of modern biotechnologies and in epidemiologic skills relevant to the prevention and control of problems in the community arising from infectious diseases.

Graduates of the MS program will have an in-depth understanding of the major laboratory, clinical, and public health aspects of humankind's microbial pathogens, and acquire epidemiologic skills relevant to the prevention and control of problems arising from infectious diseases and modern biotechnologies. Areas of emphasis will include: the design and analysis of epidemiologic data; emerging infections; tropical diseases; and applications of genomics, proteomics, and bioinformatics. MS graduates will be employed in academic and industrial research laboratories, international health agencies, NGOs, and private consulting groups. In addition, they may work in federal, state, and local public health agencies or state and local public health laboratories where their technical expertise and population-based perspective will be extremely useful. Students earning this degree will help meet a national demand that has reached critical proportions for a trained workforce in biodefense and emerging infections, and an international demand for training in diseases that affect the developing countries.

Goals

The goals of the MS Program in Public Health Microbiology and Emerging Infectious Diseases are to ensure that graduates:

- Understand the biological complexities of microbial pathogens and the diseases they cause
- Recognize the major epidemiologic and clinical features of microbial disease
- Understand how new biotechnologies (including genomics, proteomics, and bioinformatics) can be applied to the study and control of microbial pathogens
- Develop an in-depth understanding of epidemiologic principles and practice
- Apply the principles of epidemiology, microbiology, and public health practice toward the detection, surveillance, investigation, and control of microbial diseases

Course Requirements

The total 45 credit hours are distributed approximately evenly between foundation courses, required courses, elective courses, the Field/Laboratory Experience (F/LE) and the Final Project (FP). It is expected that most students will complete the degree in approximately two years to three years, depending on the course load taken each semester.

All of the required courses are offered in the late afternoon or early evening, so it is practical in many cases for students to work full- or part-time while enrolled in the program.

Foundation Courses	10 credits
Required Epidemiology/Public Health/Microbiology Courses	23 credits
Elective Courses	8 credits
Field/Laboratory Experience	2 credits
Final Project Credits	2 credits
Total	45 credits

Admissions Requirements

The Admissions Committee requires students to have the following prerequisites to apply to this degree:

- Bachelor's degree in the life sciences or at least 12 credits in the biological sciences other than botany.
- Chemistry ≥ 3 Credits
- 1 semester of calculus preferred; 2 semesters recommended.
- All prerequisites must be completed before matriculating.

Competencies

- Knowledge of the biological, environmental, and socio-behavioral determinants of human diseases, and of the public health impacts of disease. Course: PubH6003
- Knowledge of the laboratory characteristics of bacterial, viral, and parasitic pathogens, as well as biological Class A, B, C agents associated with bioterrorism. Courses: PubH 6278 (PH Virology); PubH 6276 (PH Microbiology)
- Knowledge of the public health manifestations of infectious agents. Course: PubH 6276 (PH Microbiology)
- Knowledge of the principles of public health genomics. Course: PubH 6277 (PH Genomics)
- Knowledge of the principles of microbial disease surveillance and epidemiology. Courses: PubH 6245, PubH 6259
- Skills to identify and analyze patterns of disease, to postulate hypotheses, to plan and implement studies (including outbreak investigations and analytic studies), to analyze, interpret and communicate results, and to evaluate the public health impact of such efforts. Courses: PubH 6003, PubH 6002, PubH 6245, PubH 6259
- Knowledge of public health roles and procedures of biomedical and public health laboratories. Course: PubH 6275

The curriculum sheet that follows describes the requirements for the MS Public Health Microbiology and Emerging Infectious Diseases program

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Prerequisites				Credits
Preference Given to Applicants with Biological or Public Health Laboratory Experience				
Biological Sciences other than Botany				≥ 12
Chemistry				≥ 3
Mathematics or Computer Science beyond introductory level (at least 1 semester of calculus preferred)				≥ 3
Required Foundation Courses – 10 Credits				
Course #	Course Title	Credits	Semester Offered	
PubH 6002	Biostatistical Applications for Public Health	3	Fall, Spring, Summer	
PubH 6003	Principles and Practice of Epidemiology	3	Fall, Spring, Summer	
PubH 6004	Environmental & Occupational Health	2	Fall, Spring, Summer	
PubH 6275	Essential Public Health Laboratory Skills	2	Summer	
Required Epidemiology/Microbiology Courses – 23 Credits				
Course #	Course Title	Credits	Semester Offered	
PubH 6245	Infectious Disease Epidemiology	2	Spring	
PubH 6247	Design of Health Studies	3	Fall, Spring	
PubH 6249	Use of Statistical Packages: Data Management and Data Analysis	3	Fall, Spring	
PubH 6259	Epidemiologic Surveillance in Public Health	2	Spring	
PubH 6261	Epi/Bio Skills Building Seminar	1	Fall, Spring	
PubH 6262	Introduction to Geographic Information Systems	1	Fall, Spring, Summer	
PubH 6276	Public Health Microbiology	3	Fall	
PubH 6277	Public Health Genomics	2	Spring	
PubH 6278	Public Health Virology	3	Spring	
MICR 8210	Infection and Immunity	3	Spring	
Elective Courses – 8 Credits*				
Course #	Course Title	Credits	Semester Offered	
PubH 6299	Emerging Zoonotic Diseases and Global Food Production	1	Fall	
PubH 6299	Epidemiology of Sexually Transmitted Infections	2	Spring	
PubH 6127	Applied Environmental Health Microbiology	2	Spring	

PubH 6132	WASH: Disaster Relief Management & Development	1	Fall	
PubH 6244	Clinical Epidemiology and Decision Analysis	2	Spring	
PubH 6252	Advanced Epidemiologic Methods	3	Spring	
PubH 6250	Epidemiology of HIV/AIDS	2	Fall	
PubH 6253	Issues in HIV/AIDS Care and Treatment	1	Fall	
PubH 6263	Advanced Geographic Information Systems	1	Fall	
PubH 6270	HIV/AIDS Surveillance	1	Fall	
PubH 6271	Disaster Epidemiology: Methods and Applications	1	Summer	
PubH 6358	Vaccine Policy	2	Fall	
PubH 6399	Homeland Security and Public Health	1	Varies	
PubH 6484	Prevention & Control of Vector-Borne Diseases	2	Fall, Spring	
MICR 6292	Tropical Infectious Diseases	2	Spring	
Field/Laboratory Experience and Final Project – 4 Credits				
Course #	Course Title	Credits	Semester Offered	
PubH 6016	Field/Laboratory Experience	2	Fall, Spring, Summer	
PubH 6280	Final Project	2	Fall, Spring, Summer	

**Note: There are additional elective courses not listed here that might be appropriate. Enrollment in one of these possible additional elective courses would need the consent of the Program Directors.*

Course Descriptions and Registration information can be found on the website:
<http://publichealth.gwu.edu/academics>.
<http://publichealth.gwu.edu/academics/>.