BIOSTATISTICS (MS)

NYSED: 40032 **HEGIS:** 0419.00 **CIP:** 26.1102

Overview

The Master of Science in Biostatistics program will train students in biostatistical methods for study design, data analysis, and statistical reporting for scientific and lay audiences. This degree will train students in key areas including data management, statistical reasoning, the interpretation of numeric data for scientific inference in studies in medicine and public health, and the ability to collaborate and communicate effectively with scientists and other public health stakeholders across disciplines. Graduates of the program are prepared to work as statisticians in a variety of professional environments including government, academic, healthcare, and industry. In addition, students receive training in preparation for quantitative doctoral programs in public health, such as biostatistics and epidemiology.

Students will have the opportunity to work with faculty on many public health problems. Examples include:

- Problems of randomly timed biomarker measurements in Alzheimer's disease cohort studies.
- Selection bias due to delayed entry to cohort studies.
- N-of-1 study design in Alzheimer's disease.
- Mixed-methods (qualitative/quantitative) community-engaged research focused on rigorous measurement.
- Survey research for community-based interventions and health disparities research.
- Implementation, evaluation, and enhancement of the infrastructure of community-engaged research
- Resolution of high granularity measures of disease incidence and risk from person-generated data (social media, mobile tools, wearables, etc.)
- Statistical (spatiotemporal) and machine learning methods for incorporating unstructured data in population disease modeling
- Zero-inflated count models to understand the changes in count outcomes (e.g. substance use, smoking behaviors, sexual risk-taking) over time.
- Time diary methodology to understand the temporal associations between daily behaviors, perceptions, of individual health.
- Biological biomarkers of stress among young sexual minority men and the links between sexual minority stress and biological markers of stress.

Students are engaged in several active learning opportunities outside of their courses:

- There is a journal club that meets bimonthly in which they select and present papers and lead discussion about the design and analytical issues in the papers.
- There are short-courses in computing and coding, such as in Stata and R.
- There is a consulting laboratory in which students are mentored in providing statistical consulting.

Admissions

All applicants are required to submit the following:

- SOPHAS application form, select a single area of concentration
- Official transcripts from each institution attended (or an evaluation of your credentials if you graduated from a foreign institution)
- Three letters of recommendation
- Personal statement
- Resume/CV
- English language proficiency exam (TOEFL iBT or IELTS Academic) results for all applicants whose native language is not English and who did not receive the equivalent of a US bachelor's degree at an institution where English is the primary language of instruction.
  - International students requiring a visa to attend NYU must complete the IELTS exam in person at an authorized test center. If you are required to take the exam but will not need it for visa purposes you may choose to take it online or at a test center.

Program Requirements

Course	Title	Credits
Required Courses		
GPH-GU 2106	Epidemiology	3
GPH-GU 2995	Biostatistics for Public Health	3
GPH-GU 2353	Regression I: Linear Regression and Modeling	3
GPH-GU 2354	Regression II: Categorical Data Analysis	3
GPH-GU 2361	Research Methods in Public Health	3
or GPH-GU 5361	Research Methods in Public Health	
GPH-GU 2450	Intermediate Epidemiology	3
GPH-GU 5170	Introduction to Public Health	0
Selective Courses		
Select one of the following: [1]		3
GPH-GU 2286	Introduction to Data Management and Statistical Computing	
GPH-GU 2182	Statistical Programming in R	
Select one of the following:		3
GPH-GU 2225	Psychometric Measurement and Analysis in Public Health Research and Practice	
GPH-GU 2387	Survey Design, Analysis, and Reporting	
Select one of the following:		3
GPH-GU 2480	Longitudinal Analysis of Public Health Data	
GPH-GU 2368	Applied Survival Analysis	
Select one of the following:		3
GPH-GU 2930	Epidemiological Methods and Design	
GPH-GU 3225	Statistical Inference	
GPH-GU 2363	Causal Inference: Design and Analysis	
APSTA-GE 2012	Causal Inference	
Electives		**12**
See below for information regarding electives.		
Culminating Experience		
GPH-GU 2686	Thesis I: Practice and Integrative Learning Experiences	2
GPH-GU 2687	Thesis II: Practice and Integrative Learning Experiences	2
Total Credits		**46**

[1] For all selective courses, one course is required, and the other(s) may be taken as an elective(s).

Electives

9 credits are required to have statistical content. Students are encouraged to consider electives that are focused in a particular area, such as clinical trials, statistical genetics, or machine learning, as just a few examples. The remaining 3 credits may be in a subject that requires biostatistics (e.g., genetics). The following list contains approved elective courses. Please use this Graduate Elective Substitution form (https://docs.google.com/forms/d/e/1FAIpQLSfXyVnufm694V72bBS9JuPQBa5FMoteEmOU1IPFBFnPOhDXMw/viewform/?usp=sf_link) to request approval for courses not on this list.

Electives Course List

Course	Title	Credits
GPH-GU 3152 or GPH-GU 5152	Advanced Agent-Based Modeling Introduction to Agent-Based Modeling	3
DS-GA 1019	Advanced Python for Data Science [3]	3
GPH-GU 2372	Applied Bayesian Analysis in Public Health	3
APSTA-GE 2015	Applied Spatial Statistics	2
GPH-GU 2368	Applied Survival Analysis	3
DS-GA 1004	Big Data [3]	3
CUSP-GX 8083	Big Data Management & Analysis	3
GPH-GU 2235	Biostatistical Consulting	3
GPH-GU 2363	Causal Inference: Design and Analysis	3
APSTA-GE 2012	Causal Inference	3
GPH-GU 2336	Critical Reading of the Biostatistical Literature	3
GPH-GU 2233	Data, A I, and the People's Health	3
GPH-GU 2380	Data-Driven Decision Making in Global Public Health [3]	3
APSTA-GE 2017	Databases and Data Science Practicum	2
APSTA-GE 2331	Data Science for Social Impact [3]	3
ECE-GY 7123	Deep Learning (same course as CS-GY 6953)	3
CS-GY 6953	Deep Learning (same course as ECE-GY 7123)	3
GPH-GU 2930	Epidemiological Methods and Design	3
DS-GA 1011	Fundamentals of Natural Language Processing	3
URPL-GP 2618	Geographic Information Systems and Analysis	3
GPH-GU 2126	Healthcare Claims Data Analysis	3
GPH-GU 2244	Health Care Management Science [3]	3
GPH-GU 2324	Infectious Disease Epidemiology [3]	3
GPH-GU 2152	Introduction to Agent-Based Modeling	3
GPH-GU 2286	Introduction to Data Management and Statistical Computing [4]	3
APSTA-GE 2110	Large Databases in Applied Research	3-4
GPH-GU 2480	Longitudinal Analysis of Public Health Data	3
DS-GA 1003	Machine Learning [2, 3]	3
GPH-GU 2338	Machine Learning in Public Health	3
APSTA-GE 2013	Missing Data	2
APSTA-GE 2094	Modern Approaches in Measurement	3
GPH-GU 2274	Outbreak Epidemiology: Re-emerging and Emerging Infectious Diseases [3]	3
DS-GA 1018	Probabilistic Time Series Analysis	3
DS-GA 1007	Programming for Data Science	3
GPH-GU 2225	Psychometric Measurement and Analysis in Public Health Research and Practice	3
GPH-GU 2022	SAS for Beginners: Data Management and Exploration [4]	1
ECE-GY 9343	Sel Top: Telecom Network [3]	3
GPH-GU 2366	Sequential Methods in Clinical Trials	3
GPH-GU 2198	Simulations in Biostatistics	2
GPH-GU 2512	Special Topics: Applied Spatial Statistics for Public Health	1
DS-GA 3001	Special Topics in Data Science [3]	3
GPH-GU 3225	Statistical Inference	3
GPH-GU 2378	Statistical Methods in Genomics and Bioinformatics	3
GPH-GU 2182	Statistical Programming in R	3
APSTA-GE 2014	Stats Analysis of Networks	3
PHDSW-GS 3069	Structural Equation Modeling	3
GPH-GU 2387	Survey Design, Analysis, and Reporting	3
DS-GA 1015	Text as Data	3
GPH-GU 2105	Thinking Critically and Ethically in Public Health	1.5
GPH-GU 2137	Topics in Dynamic Modeling	3
BI-GY 7633	Transcriptomics	3

[2] Must take GPH-GU 2338 Machine Learning in Public Health first.
[3] Requires approval of the Chair.
[4] Students who enroll in GPH-GU 2286 may not also take GPH-GU 2022 due to course content overlap. For students who want to take both courses, please note that GPH-GU 2022 will not count towards the degree requirements.

Sample Plan of Study Full-Time

Course	Title	Credits
1st Semester/Term		
GPH-GU 2106	Epidemiology	3
GPH-GU 2995	Biostatistics for Public Health	3
GPH-GU 2286 or GPH-GU 2182	Introduction to Data Management and Statistical Computing or Statistical Programming in R	3
GPH-GU 5170	Introduction to Public Health	0
Elective Course		3
	Credits	**12**
2nd Semester/Term		
GPH-GU 2353	Regression I: Linear Regression and Modeling	3
GPH-GU 2361 or GPH-GU 5361	Research Methods in Public Health or Research Methods in Public Health	3
GPH-GU 2450	Intermediate Epidemiology	3
Elective Course		3
	Credits	**12**
3rd Semester/Term		
GPH-GU 2686	Thesis I: Practice and Integrative Learning Experiences	2
GPH-GU 2354	Regression II: Categorical Data Analysis	3
GPH-GU 2930 or GPH-GU 3225 or GPH-GU 2363 or APSTA-GE 2012	Epidemiological Methods and Design or Statistical Inference or Causal Inference: Design and Analysis or Causal Inference	3

GPH-GU 2225 or GPH-GU 2387	Psychometric Measurement and Analysis in Public Health Research and Practice or Survey Design, Analysis, and Reporting	3
	Credits	**11**
4th Semester/Term		
GPH-GU 2687	Thesis II: Practice and Integrative Learning Experiences	2
GPH-GU 2480 or GPH-GU 2368	Longitudinal Analysis of Public Health Data or Applied Survival Analysis	3
Elective Course		3
Elective Course		3
	Credits	**11**
	Total Credits	**46**

Part-Time

Course	Title	Credits
1st Semester/Term		
GPH-GU 2106	Epidemiology	3
GPH-GU 2995	Biostatistics for Public Health	3
GPH-GU 5170	Introduction to Public Health	0
	Credits	**6**
2nd Semester/Term		
GPH-GU 2353	Regression I: Linear Regression and Modeling	3
GPH-GU 2450	Intermediate Epidemiology	3
	Credits	**6**
3rd Semester/Term		
Select one of the following:		3
GPH-GU 2286 or GPH-GU 2182	Introduction to Data Management and Statistical Computing or Statistical Programming in R	
GPH-GU 2354	Regression II: Categorical Data Analysis	3
	Credits	**6**
4th Semester/Term		
GPH-GU 2361 or GPH-GU 5361	Research Methods in Public Health or Research Methods in Public Health	3
Elective [1]		3
	Credits	**6**
5th Semester/Term		
GPH-GU 2387 or GPH-GU 2225	Survey Design, Analysis, and Reporting or Psychometric Measurement and Analysis in Public Health Research and Practice	3
Elective [1]		3
	Credits	**6**
6th Semester/Term		
GPH-GU 2480 or GPH-GU 2368	Longitudinal Analysis of Public Health Data or Applied Survival Analysis	3
Elective [1]		3
	Credits	**6**
7th Semester/Term		
GPH-GU 2686	Thesis I: Practice and Integrative Learning Experiences	2
GPH-GU 2930 or GPH-GU 3225 or GPH-GU 2363 or APSTA-GE 2012	Epidemiological Methods and Design or Statistical Inference or Causal Inference: Design and Analysis or Causal Inference	3
	Credits	**5**
8th Semester/Term		
GPH-GU 2687	Thesis II: Practice and Integrative Learning Experiences	2
Elective [1]		3
	Credits	**5**
	Total Credits	**46**

[1] Electives range from 1-3 credits, but the total number of elective credits required is 12.

Learning Outcomes

Upon completion of the Biostatistics Master of Science degree, graduates will have the skills and competencies to:

1. Apply descriptive and inferential methodologies according to the type of study design for answering a particular research question.
2. Harness basic concepts of probability, random variation and commonly used statistical probability distributions.
3. Distinguish among the different measurement scales and the implications for selection of statistical methods to be used based on these distinctions.
4. Implement the appropriate analytic methods for calculating key measures of association.
5. Understand and apply ethical principles to data acquisition, management, storage, sharing, and analysis
6. Interpret results of statistical analyses found in public health research studies.
7. Utilize relevant statistical software for data analysis.

Policies

Program Policies

Waiver Exam

The computing requirement for MPH and MS students in Biostatistics is the successful completion of GPH-GU 2182 Statistical Programming in R **or** GPH-GU 2286 Introduction to Data Management and Statistical Computing. This requirement must be completed in the first year of the degree program. Students who feel they know the material in GPH-GU 2182 Statistical Programming in R sufficiently well are eligible to take an online exam to waive one or both of the courses. The exam is offered shortly before the start of the Fall semester and students will be emailed with exact dates, along with a form to sign up for the exam. The material covered in this course includes R objects, data visualization, data import & export, and data manipulation, organizing and modifying data, operating on various data object types, creating functions and iterations for statistical simulations, and writing high-quality reports with R Markdown.

Questions about the exam may be directed to gph.bsadmin@(gph.bsadmin@nyu.edu)nyu.edu.

NYU Policies

University-wide policies can be found on the New York University Policy pages (https://bulletins.nyu.edu/nyu/policies/).

School of Global Public Health Policies

A list of related academic policies can be found on the School of Global Public Health academic policies page (https://bulletins.nyu.edu/graduate/global-public-health/academic-policies/).