MASTER OF SCIENCE IN THE FIELD OF HEALTH AND BIOMEDICAL DATA SCIENCE

This program has a fall 2021 start date.
The master of science in the field of health and biomedical data science program positions graduates to be leaders and practitioners in public health and medicine. The program blends biostatistics and bioinformatics concepts with practical experience in health data analyses, with a focus on collaboration in interdisciplinary research.

As part of their program of study, students pursue one of two tracks:

Biostatistics track
The biostatistics track prepares graduates to conduct research, undertake evaluation studies, and monitor population health status in academic, government, private sector, and community health settings. Through this research, students gain an understanding of the risk factors for chronic diseases such as diabetes, and how infectious diseases, such as Zika, Ebola, HIV/AIDS, and COVID-19, spread. Graduates work with the most vulnerable communities in order to improve health outcomes.

Bioinformatics track
The bioinformatics track prepares students for work as data analysts, informaticians, and/or software developers with opportunities in governmental, academic, and private sector settings. Graduates are primed to pursue independent doctoral-level research at leading programs in bioinformatics and computational biology. Through this research, students gain an understanding of the risk factors for chronic diseases such as cancer and how infectious diseases, such as Zika, Ebola, HIV/AIDS, and COVID-19, spread and evolve.

REQUIREMENTS

The following requirements must be fulfilled: 36 credits, including 9 credits in required core courses, completion of one of two tracks for either 15 or 21 credits. Depending on which track is selected, students take either 4 or 9 credits in common and/or track-specific elective courses and either 2 or 3 credits in consulting, research, and thesis courses.

Code	Title	Credits
Required		
Core courses (9 credits)		
PUBH 6080	Pathways to Public Health	
PUBH 6850	Introduction to SAS for Public Health Research	
PUBH 6851	Introduction to R for Public Health Research	
PUBH 6852	Introduction to Python for Public Health Research	
PUBH 6860	Principles of Bioinformatics	
PUBH 6899	Topics in Biostatistics and Bioinformatics (Ethical and Professional Skills Training)	
STAT 6201	Mathematical Statistics I	
Biostatistics track (21 credits)		
PUBH 6862	Applied Linear Regression Analysis for Public Health Research	
PUBH 6864	Applied Survival Analysis for Public Health Research	
PUBH 6865	Applied Categorical Data Analysis	
PUBH 6866	Principles of Clinical Trials	
PUBH 6879	Propensity Score Methods for Causal Inference in Observational Studies	
PUBH 6887	Applied Longitudinal Data Analysis for Public Health Research	
STAT 6202	Mathematical Statistics II	
Bioinformatics track (15 credits)		
PUBH 6884	Bioinformatics Algorithms and Data Structures	
PUBH 6859	High Performance and Cloud Computing	
PUBH 6861	Public Health Genomics	
PUBH 6885	Computational Biology	
PUBH 6886	Statistical and Machine Learning for Public Health Research	
Electives		
For the biostatistics track 4 credits and for the bioinformatics track 9 credits in courses selected from the following:		
Electives common to both tracks:		
PUBH 6853	Use of Statistical Packages for Data Management and Data Analysis	
PUBH 6856	Advanced SAS for Public Health Research	

PUBH 6899	Topics in Biostatistics and Bioinformatics (Data Visualization with R Only)
PUBH 6899	Topics in Biostatistics and Bioinformatics
PUBH 8875	Linear Models in Biostatistics
PUBH 8877	Generalized Linear Models in Biostatistics
STAT 6223	Bayesian Statistics: Theory and Applications
Electives for the biostatistics track only:	
PUBH 6003	Principles and Practices of Epidemiology
PUBH 6299	Topics in Epidemiology (Cost Effectiveness in PH Research Only)
PUBH 6861	Public Health Genomics
PUBH 6863	Applied Meta-Analysis
PUBH 6899	Topics in Biostatistics and Bioinformatics (Advanced Clinical Trials Only)
PUBH 6885	Computational Biology
PUBH 6886	Statistical and Machine Learning for Public Health Research
STAT 6227	Survival Analysis
Electives for the bioinformatics track only:	
BIOC 6240	Next Generation Sequencing
CSCI 6221	Advanced Software Paradigms
CSCI 6231	Software Engineering
PUBH 6238	Molecular Epidemiology
PUBH 6244	Cancer Epidemiology
PUBH 6262	Introduction to Geographic Information Systems
PUBH 6263	Advanced GIS
PUBH 6276	Public Health Microbiology
PUBH 6278	Public Health Virology
PUBH 6894	Research Analytics
STAT 6202	Mathematical Statistics II

Consulting, research, and thesis

2 credits for the biostatistics track and 3 credits for the bioinformatics track taken in the following courses:	
PUBH 6869	Principles of Biostatistical Consulting (1 credit, biostatistics track only)
PUBH 6897	Research in Biostatistics and Bioinformatics (2 credits, bioinformatics track only)
PUBH 6898	Master of Science Thesis (1 credit, biostatistics and bioinformatics tracks)