

INDIVIDUALIZED GENOMICS AND HEALTH, MASTER OF SCIENCE

MS in Individualized Genomics and Health (<https://advanced.jhu.edu/academics/graduate/ms-individualized-genomics-health/>)

The Master of Science in Individualized Genomics and Health program prepares students for a career in the applications of bioinformatics tools in the health care field. This emerging field requires a workforce with multi-disciplinary skills in bioinformatics, bioscience, regulatory science, policy, and ethics. Students can meet their individual career goals through the selection of a concentration or get a more bespoke experience by choosing their own set of six elective classes.

This 10-course degree program can be completed part time or full time, either online, or through a combination of onsite and online courses.

Admissions Criteria for all Advanced Academic Programs (<https://e-catalogue.jhu.edu/arts-sciences/advanced-academic-programs/enrollment-services/admission/>)

PROGRAM-SPECIFIC REQUIREMENTS

In addition to the materials and credentials required for all programs, the Master of Science in Bioinformatics requires an undergraduate degree in the biological sciences or engineering with a grade point average of at least a 3.0 on a 4.0 scale. Meeting the minimum GPA requirement does not guarantee admission. Additional requirements:

- **Resume**
- **Statement of Purpose:** Discuss why you wish to pursue the MS in Individualized Genomics and Health. Focus on your long-term goals and how this academic program will complement these goals. Discuss the strengths of your academic and professional background, as well as any additional comments that will assist in evaluating your application materials.
- **Program-Specific Prerequisite Courses:**
 - One semester of organic chemistry
 - One semester of biochemistry
 - One semester of cell biology
 - One semester of molecular biology
 - One semester of biostatistics

Program Requirements

Students must complete six required core courses and four electives.

Code	Title	Credits
Core Courses - Required:		
AS.410.610	Epigenetics, Gene Organization & Expression	4
AS.410.612	Human Molecular Genetics	4

AS.410.629	Genes & Disease	4
AS.410.633	Introduction to Bioinformatics	4
AS.410.687	Ethical, Legal & Regulatory Aspects of the Biotechnology Enterprise	4
AS.410.736	Genomic and Personalized Medicine	4
Electives (Four required)		16
Total Credits		40

Electives

Choose any graduate-level course from the Biotechnology Center. (https://e-catalogue.jhu.edu/course-descriptions/_biotechnology/)

MS in Individualized Genomics and Health with Thesis Option

Students interested in pursuing the MS in Individualized Genomics and Health with the thesis are required to take 11 courses. The thesis requires a two-semester research project. Students complete AS.410.800 Independent Research in Biotechnology, and then AS.410.801 Biotechnology Thesis the following semester. Students interested in this option should consult with the program adviser.

Concentrations (optional)

Students wishing to focus on a specialized discipline within the MS in Individualized Genomics and Health program may enroll in one of three concentrations after being accepted into the program:

- Laboratory Diagnostics
- Genomics
- Regulatory/Policy

Laboratory Diagnostics

Code	Title	Credits
Electives		
Select three of the following:		12
AS.410.641	Clinical & Molecular Diagnostics	
AS.410.656	Recombinant DNA Laboratory	
AS.410.666	Next Generation DNA Sequencing and Analysis	
AS.410.671	Gene Expression Data Analysis and Visualization	
Total Credits		12

Genomics

Code	Title	Credits
Electives		
Select three of the following:		12
AS.410.634	Practical Computer Concepts for Bioinformatics	
AS.410.635	Bioinformatics: Tools for Genome Analysis	
AS.410.666	Next Generation DNA Sequencing and Analysis	
AS.410.671	Gene Expression Data Analysis and Visualization	
AS.410.709	Cancer Genomics	
AS.410.734	Practical Introduction to Metagenomics	
Total Credits		12

Regulatory/Policy

Code	Title	Credits
Electives		
Select three of the following:		12

AS.410.676 Food And Drug Law

AS.410.702 Biomedical Software Regulation

AS.410.708 Medical Product Reimbursement

AS.410.721 In Vitro Diagnostic Regulation

Total Credits

12

Learning Outcomes

Graduates of the program should be able to:

- Employ the molecular and genetic basis for disease to explain the underlying causes
- Analyze big data sets to parse information and find patterns in data
- Apply statistical methods to large biological datasets
- Apply practices and skills from the various subfields of biotechnology
- Demonstrate ability to communicate scientifically, both orally and in writing.
- Demonstrate the ability to collaborate in a diverse group to achieve an objective