BIOINFORMATICS (MS)

Biomedical Engineering Department (https://engineering.nyu.edu/academics/departments/biomedical-engineering/)

NYSED: 24764 **HEGIS:** 1999.20 **CIP.** 26.1103

Program Description

Revolutionary changes are taking place in how we interpret health and treat disease. With extraordinary advances in both gene sequencing and machine learning, the bioinformatics field is expanding exponentially and creating a myriad of opportunities for professionals with in-depth knowledge of techniques for mastering complex data.

In NYU Tandon's Bioinformatics Master of Science program, students will build strong skills in molecular biology and big data analysis. Develop solutions to critical challenges throughout medicine and the life sciences by learning to utilize genomic information and next generation sequence analysis tools.

By creating and advancing algorithms, utilizing computational and statistical techniques, and applying theory, students can solve practical problems that arise in the management of biological data. Prepare to make significant contributions to society through groundbreaking innovations in cancer care, vaccine design, agriculture, and energy.

Admissions

To apply for admission to any Tandon graduate program, please contact the Office of Graduate Admissions (https://engineering.nyu.edu/admissions/graduate/).

Program Requirements

The program requires the completion of 30 credits, comprised of the following:

Course	Title	Credits
Required Courses		
BI-GY 7453	Algorithms and Data Structures for Bioinformatics	3
BI-GY 7653	Next Generation Sequence Analysis for Bioinformatics	3
BI-GY 7663	Problem Solving For Bioinformatics	3
BI-GY 7673	Applied Biostatistics for Bioinformatics	3
BI-GY 7683	Biology and Biotechnology for Bioinformatics	3
BI-GY 7743	Machine Learning and Data Science for Bioinformatics	3
Electives		
The electives are comprised of a combination of track electives and bioinformatics electives. Each student must complete the requirements of one of the tracks below. A total of 9 elective credits are required.		9
Tracks		
Each student is required to complete one of the following tracks:		
Laboratory Science Track		
This track requires the following track elective:		
BI-GY 7543	Proteomics for Bioinformatics	
Translational Science Track		
This track requires the following two track electives:		
BI-GY 7693	Population Genetics and Evolutionary Biology for Bioinformatics	
BI-GY 7733	Translational Genomics and Computational Biology	
Bioinformatics Electives		
The remaining electives will be chosen from the list below. Students also have the option of taking additional track electives, which will count as bioinformatics electives.		
BI-GY 7573	Special Topics in "Informatics in Chemical and Biological Sciences"	
BI-GY 7633	Transcriptomics	
BI-GY 7753	Bioinformatics Guided Studies	
Bioinformatics Electives from Other NYU Schools		
BMIN-GA 3007	Deep Learning for Biomedical Data	
BMIN-GA 4498	Advanced Integrative Omics	
INTER-MD 237190	Introduction to Health Informatics	
Capstone		
BI-GY 810X	Bioinformatics Capstone [1]	3
Total Credits		**30**

[1] Students may enroll in the capstone course across multiple semesters for a total of up to 9 credits. Additional capstone credits, beyond the 3 required, will count as electives (specifically, bioinformatics electives).

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
BI-GY 7453	Algorithms and Data Structures for Bioinformatics	3
BI-GY 7663	Problem Solving For Bioinformatics	3
	Credits	**6**
2nd Semester/Term		
BI-GY 7653	Next Generation Sequence Analysis for Bioinformatics	3
BI-GY 7673	Applied Biostatistics for Bioinformatics	3
	Credits	**6**
3rd Semester/Term		
BI-GY 7683	Biology and Biotechnology for Bioinformatics	3
BI-GY XXXX	Track Elective	3
	Credits	**6**
4th Semester/Term		
BI-GY 7743	Machine Learning and Data Science for Bioinformatics	3
BI-GY XXXX	Track Elective **OR** Bioinformatics Elective	3
	Credits	**6**
5th Semester/Term		
BI-GY 810X	Bioinformatics Capstone	3
BI-GY XXXX	Bioinformatics Elective	3
	Credits	**6**
	Total Credits	**30**

Learning Outcomes

Upon successful completion of the program, graduates will:

1. Perform Big Data of Omics datasets. This includes scalable applications.
2. Demonstrate command of R & Bioconductor, Python & Biopython, as well as UNIX to process, analyze, and maintain quality control of biological data.

3. Demonstrate command of the fundamentals of Bioinformatics & Computational Biology with Biologist, Computer Scientist, as well as Statisticians through written or verbal communication.
4. Demonstrate understanding of fundamental concepts of mathematics and computer science as they relate to Bioinformatics & Computational Biology.
5. Solid knowledge of Bioinformatics & Computational Biology resources and tools for research and analysis.
6. Application of Next Generation Sequence Analysis, Machine Learning and Translational Genomics in healthcare.

Policies

NYU Policies

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

Tandon Policies

Additional academic policies can be found on the Tandon academic policy page (https://bulletins.nyu.edu/graduate/engineering/academic-policies/).